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BAKER (MICHAEL) JR INC BEAVER PA F/G 13/13
NATIONAL DAM INSPECTION PROGRAM. PINE RUN DAM (NDI NUMBER PA-00--ETC(U)
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F/G 13/13

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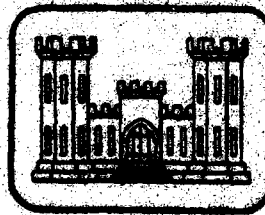
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OHIO RIVER BASIN
PINE RUN, MERCER COUNTY
PENNSYLVANIA

PINE RUN DAM
(PA 491)

NDI No. PA 00737
PennDER No. 43-55
SCS No. PA 491

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM



prepared for

DEPARTMENT OF THE ARMY
Baltimore District, Corps of Engineers
Baltimore, Maryland 21203

prepared by

MICHAEL BAKER, JR., INC.

Consulting Engineers
4301 Dutch Ridge Road
Beaver, Pennsylvania 15009

May 1980

MICHAEL BAKER, JR., INC.

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OHIO RIVER BASIN

PINE RUN DAM
(PA 491)
MERCER COUNTY, COMMONWEALTH OF PENNSYLVANIA
NDI No. PA 00737
PennDER No. 43-55
SCS No. PA 491

(6) PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM.

Pine Run Dam (NDI Number PA-00737,
PennDER Number 43-55, SCS Number
PA-491), Ohio River Basin, Pine Run,
Mercer County, Pennsylvania, Phase I
Inspection Report.

Prepared for: DEPARTMENT OF THE ARMY
Baltimore District, Corps of Engineers
Baltimore, Maryland 21203

Prepared by: MICHAEL BAKER, JR., INC.
Consulting Engineers
4301 Dutch Ridge Road
Beaver, Pennsylvania 15009

(15) DAEW 31-88-C-0025

(10) John A. Dziubek

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PREFACE

This report is prepared under guidance contained in the "Recommended Guidelines for Safety Inspection of Dams," for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I Inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established guidelines, the spillway design flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. The spillway design flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I REPORT
NATIONAL DAM INSPECTION PROGRAM

Pine Run Dam (PA 491), Mercer County, Pennsylvania
NDI No. PA 00737, PennDER No. 43-55, SCS No. PA 491
Pine Run
Inspected 8 and 10 December 1979

ASSESSMENT OF
GENERAL CONDITIONS

Pine Run Dam is classified as a "Small" size - "Significant" hazard dam. The dam, owned by the Mercer County Commissioners, is used to reduce floodwater damages in the Little Shenango Watershed. The dam and appurtenant structure were found to be in good condition at the time of the inspection.

Hydraulic/hydrologic evaluations, performed in accordance with procedures established by the Baltimore District, U.S. Army Corps of Engineers, for Phase I Inspection Reports, revealed that the spillway will pass the Probable Maximum Flood (PMF) without overtopping the dam. A spillway design flood (SDF) in the range of the 100-year flood to the 1/2 Probable Maximum Flood (1/2 PMF) is required for Pine Run Dam. The spillway is therefore considered to be "adequate".

The visual inspection and review of information did not reveal any problems or deficiencies which require remedial action by the owners of the dam at this time.

It is recommended that the owners continue their inspections and maintenance programs to maintain the dam in good condition.

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PINE RUN DAM



Submitted by:

MICHAEL BAKER, JR., INC.

John A. Dziubek

John A. Dziubek, P.E.
Engineering Manager-Geotechnical

Date: 8 May 1980

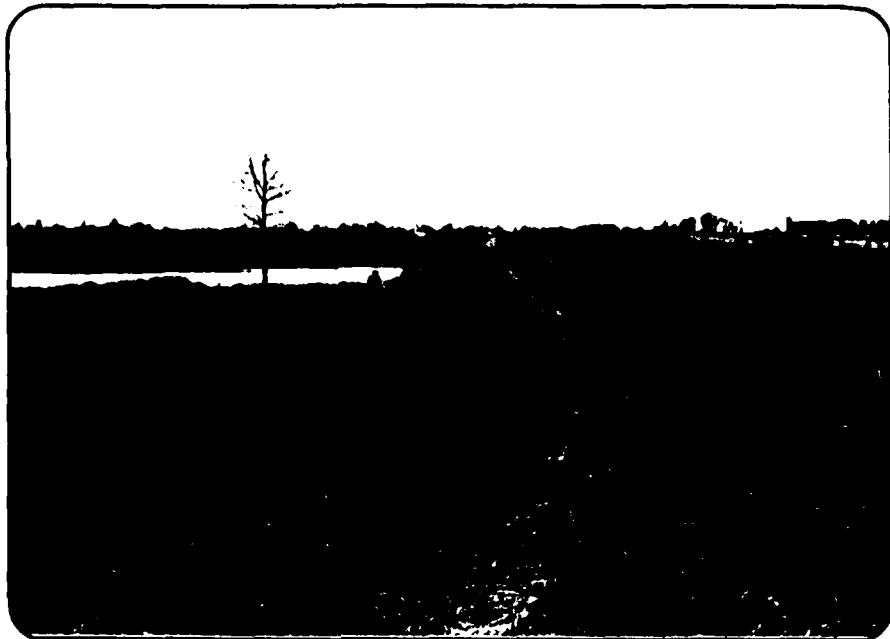
Approved by:

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, CORPS OF ENGINEERS

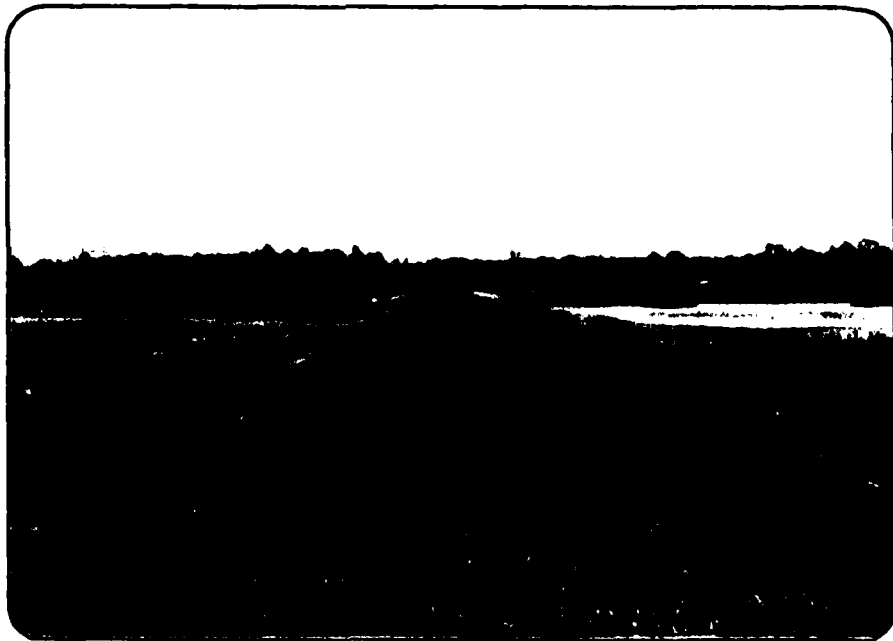
James W. Peck
JAMES W. PECK
Colonel, Corps of Engineers
District Engineer

Date: 28 May 1980

PINE RUN DAM



Overall View of Dam from Right End (Junction with right wing) of the Main Embankment



Overall View of Dam from Left End (Junction with emergency spillway) of the Main Embankment

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PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM
PINE RUN DAM (PA 491)
NDI No. PA 00737, PennDER No. 43-55, SCS No. PA 491

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

- a. Authority - The Dam Inspection Act, Public Law 92-367, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a program of inspection of dams throughout the United States.
- b. Purpose of Inspection - The purpose of the inspection is to determine if the dam constitutes a hazard to human life or property.

1.2 DESCRIPTION OF PROJECT

- a. Description of Dam and Appurtenances - Pine Run Dam (PA 491) is a homogeneous earthfill embankment with a total length of 1945 feet, including the emergency spillway on the left abutment, and a maximum height of 17 feet. The crest width of the dam is 12 feet. The upstream face of the embankment has a slope of 3H:1V (Horizontal to Vertical) with a 10 foot bench located approximately 3 feet up from the bottom of the embankment (between Elevation 1272.6 feet Mean Sea Level [M.S.L.] and Elevation 1273.6 feet M.S.L.). The downstream face of the dam has a slope of 2H:1V. A cut-off trench with a minimum depth of 5 feet, side slopes of 1H:2V, and a bottom width of 12 feet was constructed under the entire embankment. A toe drain consisting of a drain trench and perforated 12 inch diameter pipe was installed along the toe of the downstream face of the embankment. This drain system extends for 1836 feet.

The principal spillway is a drop-inlet structure consisting of a two stage reinforced concrete riser connected to a 36 inch diameter reinforced concrete outlet pipe. The concrete riser has an orifice 1.0 foot high by 2.3 feet wide serving as a low-level inlet which controls the normal pool level (Elevation 1272.6 feet M.S.L.). A metal trash rack covers the entrance to this inlet. The upper intake consists of two overflow weirs with rounded downstream edges. The weirs are located

on either side of the intake tower 4.7 feet above the invert of the low level intake. The weirs are 9 feet long and there is an opening 9 feet wide by 1.5 feet high over each weir. These upper level intakes are also protected by metal trash racks.

The outlet pipe from the riser unit is 80 feet long and has two concrete anti-seep collars and a concrete cradle. The pipe exits into a concrete impact basin at the downstream toe of the embankment.

There is a 21 inch diameter reservoir drain pipe which extends 10 feet out into the reservoir from the bottom of the riser unit. The invert elevation of this drain pipe is 1268.3 feet M.S.L., 4.3 feet below the invert elevation of the low level intake. The entrance to this pipe is closed at the present time.

The emergency spillway for the dam is located at the left abutment. It consists of a grass-lined trapezoidal channel 125 feet wide with side slopes of 3H:1V. The spillway was designed as an earth cut in the left abutment of the dam. The control section in the spillway, located a short distance downstream from the crest of the dam, is at Elevation 1279.7 feet M.S.L., 7.1 feet above the invert elevation of the low level inlet. A drain system consisting of 4 inch perforated plastic tubing was installed in the left abutment of the emergency spillway.

- b. Location - Pine Run Dam is located on Pine Run, approximately 2 miles southwest of Carpenters Corners and 2.5 miles south of Clarks Mills. The dam and reservoir are located in Fairview Township, Mercer County, Pennsylvania and can be found on the USGS 7.5 minute topographic quadrangle Jackson Center, Pennsylvania. The coordinates of the dam are N 41° 25.2' and W 80° 11.4'.
- c. Size Classification - The dam has a maximum height of 17 feet and a storage capacity of 223.5 acre-feet. The dam is therefore in the "Small" size category.
- d. Hazard Classification - There are several homes and a rural road (T-691) approximately 1250 to 2000 feet downstream from the dam which would suffer economic damage if the dam were to fail. It is not considered likely that there would be loss of life from a dam failure. The dam is

therefore considered to be in the "Significant" hazard category.

- e. Ownership - The dam is owned by the Mercer County Commissioners, Mercer County Courthouse, Mercer, Pennsylvania 16137.
- f. Purpose of Dam - Pine Run Dam is one of several floodwater retarding dams constructed by the Soil Conservation Service (SCS) in the Little Shenango Watershed. Its purpose is to reduce floodwater damages in downstream areas of the watershed.
- g. Design and Construction History - Design of Pine Run Dam was completed in 1968 by the SCS. The dam was constructed in 1970 by Kirila Contractors, Inc., of Brookfield, Ohio.
- h. Normal Operating Procedures - The reservoir level is typically maintained by the low level inlet of the riser structure, Elevation 1272.6 feet M.S.L. Mercer County and SCS personnel inspect the dam each year according to the procedures for annual inspections of SCS dams of this type.

1.3 PERTINENT DATA

- a. Drainage Area (square miles) - 1.64¹
- b. Discharge at Dam Site (c.f.s.) -
 - Peak Outflow at -
 - Crest of Riser (El. 1277.3 ft. M.S.L.) - 23
 - Crest of Emergency Spillway (El. 1279.7 ft. M.S.L.) - 112
 - Design High Water (El. 1283.9 ft. M.S.L.) - 2070
 - Top of Dam (El. 1286.1 ft. M.S.L.) - 4983
- c. Elevation (feet above M.S.L.) -
 - Design Top of Dam - 1286.1
 - Average Top of Dam - 1286.4

¹The drainage area measured on the USGS quad for the watershed was 1.64 square miles. SCS design information shows a drainage area of 2.24 square miles. The SCS drainage area apparently includes a swampy area (Halfmoon Swamp) which lies to the east of the dam.

Minimum Top of Dam -	1286.1
Invert of Low Level Outlet -	1272.6
Upper Level Outlet -	1277.3
Emergency Spillway Crest -	1279.7
Normal Pool -	1272.6
Maximum Design Pool -	1283.9
d. <u>Reservoir (feet) -</u>	
Length of Normal Pool (El. 1272.6 ft. M.S.L.) -	830
Length of Maximum Pool (El. 1283.9 ft. M.S.L.) -	2840
e. <u>Storage (acre-feet) -</u>	
Top of Dam (El. 1286.1 ft. M.S.L.) -	652
Maximum Design Pool (El. 1283.9 ft. M.S.L.) -	483
Crest of Emergency Spillway (El. 1279.7 ft. M.S.L.) -	225
Normal Pool (El. 1272.6 ft. M.S.L.) -	17.7 ²
f. <u>Reservoir Surface (acres) -</u>	
Top of Dam (El. 1286.1 ft. M.S.L.) -	84.6
Maximum Design Pool (El. 1283.9 ft. M.S.L.) -	70.5
Crest of Emergency Spillway (El. 1279.7 ft. M.S.L.) -	53.0
Normal Pool (El. 1272.6 ft. M.S.L.) -	11.3
g. <u>Dam -</u>	
Type -	Earthfill embankment
Length (feet) -	1945
Height (feet) -	17
Crest Width (feet) -	12
Slopes - Upstream -	3H:1V
Downstream -	2H:1V
Impervious Core -	None
Cut-off - There is a cut-off trench a minimum of 5 feet deep with a bottom width of 12 feet and 1H:2V side slopes under the entire em- bankment.	

²This storage is reserved for a 50 year accumulation of sediment and is not included in floodwater storage calculations.

Drains - A drain trench and perforated 12 inch diameter pipe was placed along the toe of the downstream face of the embankment and extends for 1836 feet.

h. Diversion and Regulatory Tunnel - None

i. Spillway (Emergency Spillway) -

Type - Vegetated trapezoidal earth channel at the left abutment.

Length (feet) - 1260

Bottom Width (at control section, feet) -

125

Side Slopes -

3H:1V

Crest Elevation (feet M.S.L.) -

1279.7

j. Regulating Outlets - A drop-inlet structure consisting of a two stage reinforced concrete riser connected to a 36 inch diameter reinforced concrete conduit serves as the principal spillway. The low level inlet, invert Elevation 1272.6 ft. M.S.L., controls the normal pool level and consists of an orifice 1.0 foot high by 2.3 feet wide. The upper level inlet consists of an overflow weir (crest Elevation 1277.3 ft. M.S.L.). The exit invert of the outlet pipe is at Elevation 1266.4 ft. M.S.L.

A 21 inch reservoir drain pipe extends 10 feet out into the reservoir from the bottom of the riser unit. The entrance invert elevation of this drain pipe is 1268.3 ft. M.S.L. The opening to the pipe is closed at the present time.

SECTION 2 - ENGINEERING DATA

2.1 DESIGN

Pine Run Dam was designed as a single purpose flood prevention dam. It is one of seven proposed floodwater retarding dams in the Little Shenango Watershed intended to reduce floodwater damages in the basin. It was designed to retard the 100-year frequency storm without discharge occurring in the emergency spillway.

Pine Run Dam was designed by the SCS according to its standard procedures for structures of this type. Design data reviewed for this report included the following:

- 1) SCS Drawings No. PA-491-P, "Little Shenango River Watershed, Floodwater Retarding Dam PA 491, Crawford and Mercer Counties, Pennsylvania," 18 sheets "as built", 1970.
- 2) "Design Report, Site PA-491, Pennsylvania", U.S. Department of Agriculture, Soil Conservation Service, undated (copy in file of Harrisburg office of SCS).

2.2 CONSTRUCTION

The construction of Pine Run Dam was performed by Kirila Contractors, Inc. of Brookfield, Ohio, in 1970. No mention of significant problems during construction is made in any of the available information.

2.3 OPERATION

The pond is typically maintained by the low level inlet of the riser structure, Elevation 1272.6 feet M.S.L. Mercer County and SCS personnel inspect the dam each year according to the procedures for annual inspections of SCS dams of this type.

2.4 EVALUATION

- a. Availability - The information reviewed is readily available from the SCS office in Harrisburg, PA.
- b. Adequacy - The information available is adequate for a Phase I Inspection of this dam.
- c. Validity - There is no reason at the present time to question the validity of any of the available information.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

- a. General - The visual inspection was performed on 8 December 1979 and 10 December 1979. Snow was falling intermittently on 8 December 1979 but this snow had melted and clear weather was experienced at the inspection on 10 December 1979. The pool level was 0.5 foot above normal pool. The dam and appurtenances were found to be in good condition at the time of inspection. Noteworthy observations made during the visual inspection are described in the following paragraphs. The complete visual inspection check list, field sketch, top of dam profile, and typical cross-section are presented in Appendix A.

- b. Dam - There is some minor tire rutting along the crest of the embankment from vehicles being driven over the dam. A gate has been installed at the right wing of the embankment to prevent vehicles from traveling on the embankment.

Some areas in which the soil was saturated were observed downstream from the toe of the dam. This saturated soil is probably the result of a naturally high groundwater table and recent snow melt, and not seepage through the embankment.

- c. Appurtenant Structures - The concrete in the riser unit appeared to be in good condition. An insignificant amount of debris had accumulated at the trash rack in front of the low level inlet. The riser outlet, impact basin, and discharge channel all appeared to be in good condition.

There was some minor ponding of water in the emergency spillway. This water is probably from recent snow melt and high groundwater table. It does not represent any significant problem to the stability of the emergency spillway.

- d. Reservoir Area - The reservoir area and watershed are moderately sloping and consist primarily of farmland and forests. The dam was designed with a sediment storage capacity equivalent to 50 years of sediment accumulation. There was no indication that sedimentation was occurring at a faster rate than that anticipated by the SCS in the design of this dam.

- e. Downstream Channel - The slopes of the downstream channel are moderate. There is a rural road (T-691) and a few habitable structures located approximately 1250 to 2000 feet downstream from the dam.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 PROCEDURES

The dam and appurtenances are inspected by Mercer County and SCS personnel each year according to the procedures for annual inspections of SCS dams of this type. The emergency warning procedure developed for the dam is discussed in Section 4.3.

4.2 MAINTENANCE OF DAM AND APPURTENANCES

Routine maintenance is performed periodically by Mercer County personnel. At the present time, maintenance of the dam is considered to be adequate.

4.3 DESCRIPTION OF ANY WARNING SYSTEM IN EFFECT

The Mercer County Commissioners, owners of the dam, are responsible for providing surveillance of the dam during periods of unusually heavy precipitation and initiating the procedures outlined below should an emergency arise.

a. Action by Mercer County Flood Control Observers

- 1) During periods of heavy precipitation amounting to 1.0 inch per hour or 1.5 inches in a 24 hour period, the County Conservation Environmental Coordinator will be contacted.

b. Action by Mercer County Environmental Coordinator

- 1) When advised by flood control observers that rainfall amounting to 1.0 inch per hour or 1.5 inches in a 24 hour period is being experienced in the watershed, the Mercer County Environmental Coordinator and/or designated representative will visit the dam site for routine surveillance.
- 2) Should the rain continue and the water level continue to rise, surveillance will be increased to every six hours.
- 3) When the water level covers the riser, surveillance will be increased to every 2 hours.
- 4) Should the water level reach 1 foot below the emergency spillway, the Federal Emergency Management Agency (FEMA) will be contacted to stand by on alert.

- 5) When the water level enters the emergency spillway, the FEMA will be notified to activate plans for the evacuation of downstream residents.
- 6) When the water level enters the emergency spillway control section, the FEMA will be notified to intensify the evacuation of residents downstream.
- 7) Surveillance will be continued until the water level recedes from the emergency spillway.

4.4 EVALUATION OF OPERATIONAL ADEQUACY

The nature of Pine Run Dam and its appurtenances are such that the present operational and maintenance procedures are considered to be adequate.

SECTION 5 - HYDRAULIC/HYDROLOGIC

5.1 EVALUATION OF FEATURES

- a. Design Data - Hydrologic and hydraulic design calculations for Pine Run Dam were obtained from the SCS design report. The dam was constructed to reduce floodwater damages. It was designed to retard a 100-year frequency storm without discharge occurring in the emergency spillway. A sediment storage volume equivalent to a 50 year accumulation of sediment has been provided.

The elevations of the design high water and top of dam were determined by routing the emergency spillway and freeboard hydrographs through the reservoir. Both hydrographs were based on a storm duration of 6 hours. A brief summary of the rainfall and hydrograph data used in the analysis is presented in the following table.

<u>Hydrograph</u>	<u>6-hour Rainfall (inches)</u>		<u>Run-off (inches)</u>
	<u>Point</u>	<u>Areal</u>	
Emergency Spillway	10.25	9.53	8.56
Freeboard	20.50	19.07	15.90

The results of the flood routing analysis are as follows:

<u>Hydrograph</u>	<u>Peak Inflow (c.f.s.)</u>	<u>Maximum Outflow (c.f.s.)</u>	<u>Maximum Reservoir Elevation (feet M.S.L.)</u>
Emergency Spillway	3126	2070	1283.9
Freeboard	6056	4983	1286.1

- b. Experience Data - Mercer County personnel reported that the emergency spillway has never been activated on this dam. No records of maximum pool levels are available.
- c. Visual Observations - No conditions were observed during the visual inspection which would indicate that the dam and appurtenances could not perform satisfactorily during a flood event.
- d. Overtopping Potential - Pine Run Dam is a "Small" size - "Significant" hazard dam requiring evaluation for a spillway design flood (SDF) in the range of

the 100-year flood to the 1/2 Probable Maximum Flood (1/2 PMF). Since the dam was designed by the SCS using an SDF developed with precipitation values close to the Probable Maximum Precipitation (Refer to Appendix D, Page 3), no further hydrologic or hydraulic analysis was performed. The SCS calculations were, however, reviewed and judged to be accurate.

- e. Spillway Adequacy - The dam, as outlined above, was designed based on a freeboard hydrograph which is essentially equal to the Probable Maximum Flood (PMF). Therefore, the spillway is considered to be "adequate".

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

- a. Visual Observations - No structural inadequacies were noted during the visual inspection of Pine Run Dam.
- b. Design and Construction Data - The dam was designed and constructed according to standard SCS procedures for structures of this type. Although a reference is made to the soil mechanics report which would include a summary of the stability analysis for the dam, this particular report was not available in the design folder reviewed for the dam. A memorandum in the design folder dated 23 February 1967 mentions that adequate factors of safety were obtained for a 3H:1V upstream slope and 2H:1V downstream slope for the dam. These slopes are the "as built" configuration for the dam and are considered adequate.
- c. Operating Records - Nothing in the readily available operating information indicates cause for concern relative to the structural stability of the dam.
- d. Post-Construction Changes - No changes adversely affecting the structural stability of the dam have been performed.
- e. Seismic Stability - The dam is located in Seismic Zone 1 of the "Seismic Zone Map of the Contiguous United States", Figure 1, page D-30, "Recommended Guidelines for Safety Inspection of Dams." This is a zone of minor seismic activity. Therefore, further consideration of the seismic stability is not warranted.

SECTION 7 - ASSESSMENT, RECOMMENDATIONS/REMEDIAL MEASURES

7.1 DAM ASSESSMENT

- a. Safety - The dam and its appurtenant structures were found to be in good overall condition at the time of the inspections. Pine Run Dam is a "Small" size - "Significant" hazard dam requiring evaluation for a SDF in the range of the 100-year flood to the 1/2 PMF. As discussed in Section 5, the dam was designed by the SCS to safely pass the PMF event without overtopping the dam. The spillway is therefore considered to be "adequate".
- b. Adequacy of Information - The information available and the observations made during the field inspection are considered to be adequate for a Phase I Inspection Report.
- c. Urgency - At the present time, there are no significant problems which require remedial action by the owners of the dam.
- d. Necessity for Additional Data/Evaluation - No conditions were observed during the inspection of this dam which warrant additional evaluation at this time.

7.2 RECOMMENDATIONS/REMEDIAL MEASURES

The inspection and review of information did not reveal any problems or deficiencies which require that the owners of the dam perform any remedial measures.

The owners of the dam should continue inspection and maintenance programs to insure that the dam remains in good condition.

APPENDIX A

VISUAL INSPECTION CHECK LIST, FIELD SKETCH,
TOP OF DAM PROFILE, AND TYPICAL CROSS-SECTION

Check List
Visual Inspection
Phase 1

Name of Dam Pine Run Dam County Mercer State PA Coordinates Lat. N 41°25.2'
 NDI # PA 00737
 PennDER # 43-55 Long. W 80°11.4'
 SCS # PA 491
 Date of Inspection 8 December 1979 Overcast, snowing
10 December 1979 Weather Clear Temperature 30° F.

Pool Elevation at Time of Inspection 1273.2 ft.* M.S.L. Tailwater at Time of Inspection 1267.5 ft.* M.S.L.

*All elevations are referenced to the invert elevation of the low level intake, EL. 1272.6 ft. M.S.L.

Inspection Personnel:

Michael Baker, Jr., Inc.:

8 December 1979:
James G. Ulinski
Wayne D. Lasch
Jeff S. Maze

10 December 1979:
James G. Ulinski
Wayne D. Lasch
Larry A. Diday

Owner's Representatives:

James G. Ulinski Recorder

CONCRETE/MASONRY DAMS - Not Applicable

Name of Dam: PINE RUN DAM
 NDI # PA 00737

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
-----------------------	--------------	----------------------------

LEAKAGE

STRUCTURE TO
 ABUTMENT/EMBANKMENT
 JUNCTIONS

DRAINS

WATER PASSAGES

FOUNDATION

CONCRETE/MASONRY DAMS - Not Applicable

Name of Dam: PINE RUN DAM
 NDI # PA 00737

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES		
STRUCTURAL CRACKING		
VERTICAL AND HORIZONTAL ALIGNMENT		
MONOLITH JOINTS		
CONSTRUCTION JOINTS		

EMBANKMENT

Name of Dam PINE RUN DAM
 NDI # PA 00737

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	None observed	

UNUSUAL MOVEMENT OR
 CRACKING AT OR BEYOND
 THE TOE

None observed

SLOUGHING OR EROSION OF
 EMBANKMENT AND ABUTMENT
 SLOPES

None were observed. There is some minor
 tire rutting on the crest of the dam;
 however, a gate has been installed at
 the end of the right wing of the embank-
 ment to keep vehicles off of the dam.

This is considered minor and
 no action is recommended.

EMBANKMENT

Name of Dam PINE RUN DAM
 NDI # PA 00737

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	No problems in the vertical and horizontal alignment of the dam were observed.	
RIPRAP FAILURES	There is a section of the principal spillway outlet channel downstream from the impact basin that is ripped. No problems were observed.	
VEGETATION	The entire embankment is covered with a thick growth of grass.	

EMBANKMENT

Name of Dam PINE RUN DAM
 NDI # PA 00737

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	These areas are in good condition. No problems were observed.	
ANY NOTICEABLE SEEPAGE	No seepage was observed.	
STAFF GAGE AND RECORDER	None	
DRAINS	There was some flow out of the toe drains emptying into the impact basin. The left and right drains had approximately 1 and 4 g.p.m. flowing out of them, respectively.	

OUTLET WORKS - (Principal Spillway)

Name of Dam: PINE RUN DAM
NDI # PA 00737

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	None observed	
INTAKE STRUCTURE	The concrete and metal surfaces of the intake unit were in good condition.	
OUTLET STRUCTURE	The concrete impact basin was in good condition.	
OUTLET CHANNEL	The outlet channel was clear of vegeta- tion and debris. No problems were observed.	
EMERGENCY GATE	None	

UNGATED SPILLWAY - (Emergency Spillway)

Name of Dam: PINE RUN DAM
 NDI # PA 00737

VISUAL EXAMINATION OF		OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	None		
APPROACH CHANNEL	The emergency spillway consists of a vegetated trapezoidal earth channel at the left abutment. There was some water accumulated in the channel. This water was probably the result of recent precipitation. No other problems were observed.		
DISCHARGE CHANNEL	Some water was also in the downstream portion of the emergency spillway. No other problems were observed.		
BRIDGE AND PIERS	None		

GATED SPILLWAY - Not Applicable

Name of Dam: PINE RUN DAM
 NDI # PA 00737

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
-----------------------	--------------	----------------------------

CONCRETE SILL

APPROACH CHANNEL

DISCHARGE CHANNEL

BRIDGE AND PIERS

GATES AND OPERATION
EQUIPMENT

INSTRUMENTATION - None

Name of Dam: PINE RUN DAM
NDI # PA 00737

VISUAL EXAMINATION	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
--------------------	--------------	----------------------------

MONUMENTATION/SURVEYS

OBSERVATION WELLS

WEIRS

PIEZOMETERS

OTHER

RESERVOIR

Name of Dam: PINE RUN DAM
NDI # PA 00737

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
-----------------------	--------------	----------------------------

SLOPES

Slopes of the reservoir and watershed are moderate. The area is primarily farmland and forests. No slope stability problems were observed.

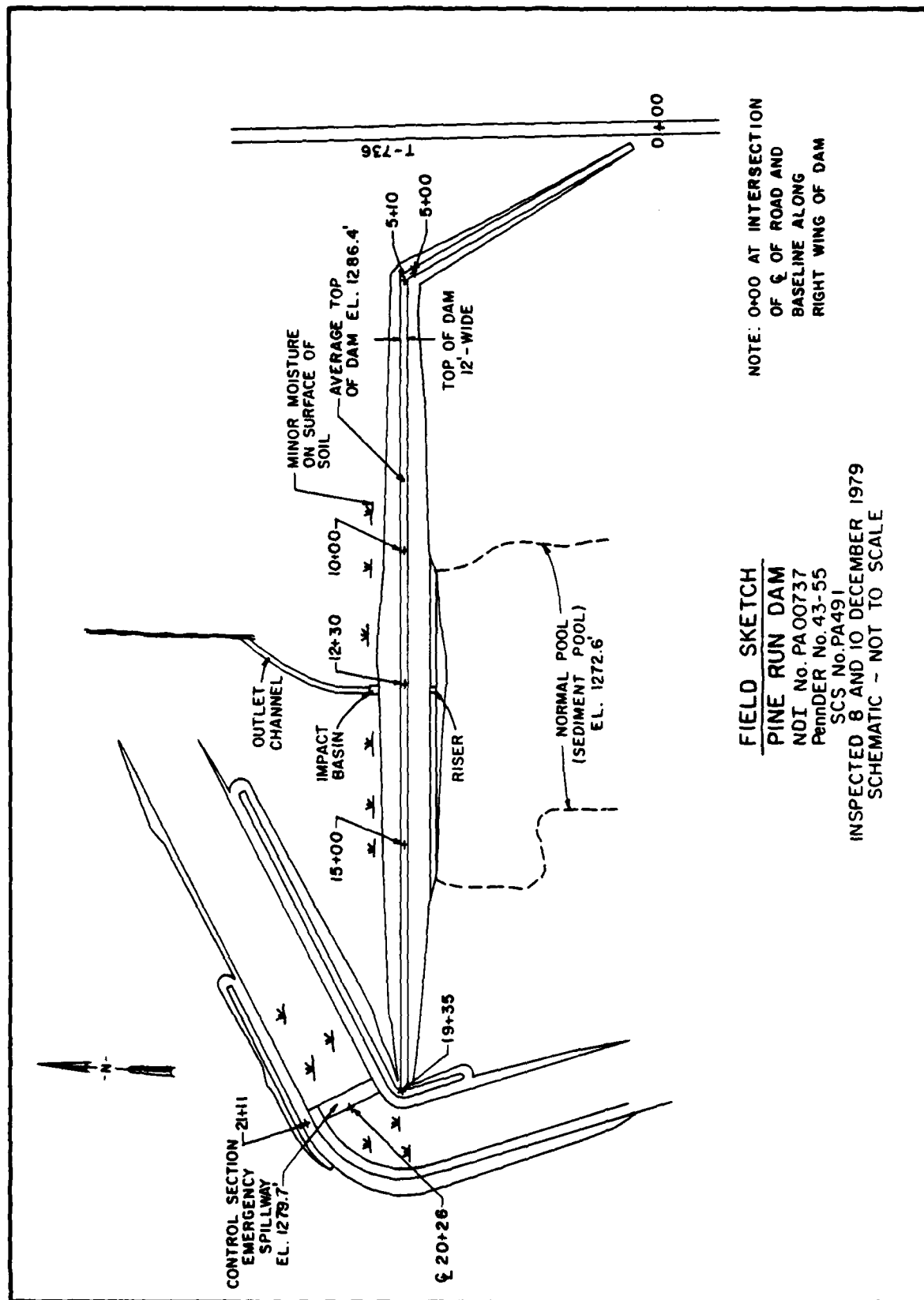
SEDIMENTATION

The reservoir was designed with a sediment storage capacity equivalent to 50 years of sediment accumulation. There was no indication that sedimentation is occurring at a rate faster than that anticipated by the SCS in the design of this dam.

DOWNSTREAM CHANNEL

Name of Dam: PINE RUN DAM
 NDI # PA 00737

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	There were no obstructions or debris in the downstream channel.	
SLOPES	The downstream channel has a mild to moderate slope. It passes through open fields for approximately 1500 ft.	
APPROXIMATE NO. OF HOMES AND POPULATION	There is a road (T-691) approximately 1250 ft. downstream from the dam. A few scattered structures are located further downstream. No loss of life is expected if the dam were to fail.	



NOTE: 0+00 AT INTERSECTION
OF ϕ OF ROAD AND
BASELINE ALONG
RIGHT WING OF DAM

FIELD SKETCH
PINE RUN DAM
NDI No. PA00737
Pender No. 43-55
SCS No. PA491
INSPECTED 8 AND 10 DECEMBER 1979
SCHEMATIC - NOT TO SCALE

MICHAEL BAKER, JR., INC.

A-14

THE BAKER ENGINEERS

8 December 1979

Box 280

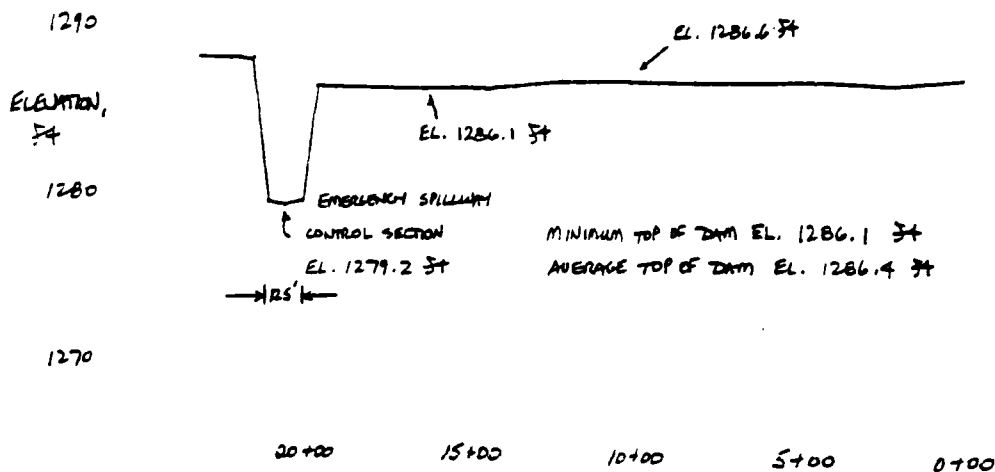
Beaver, Pa. 15009

PINE RUN DAM

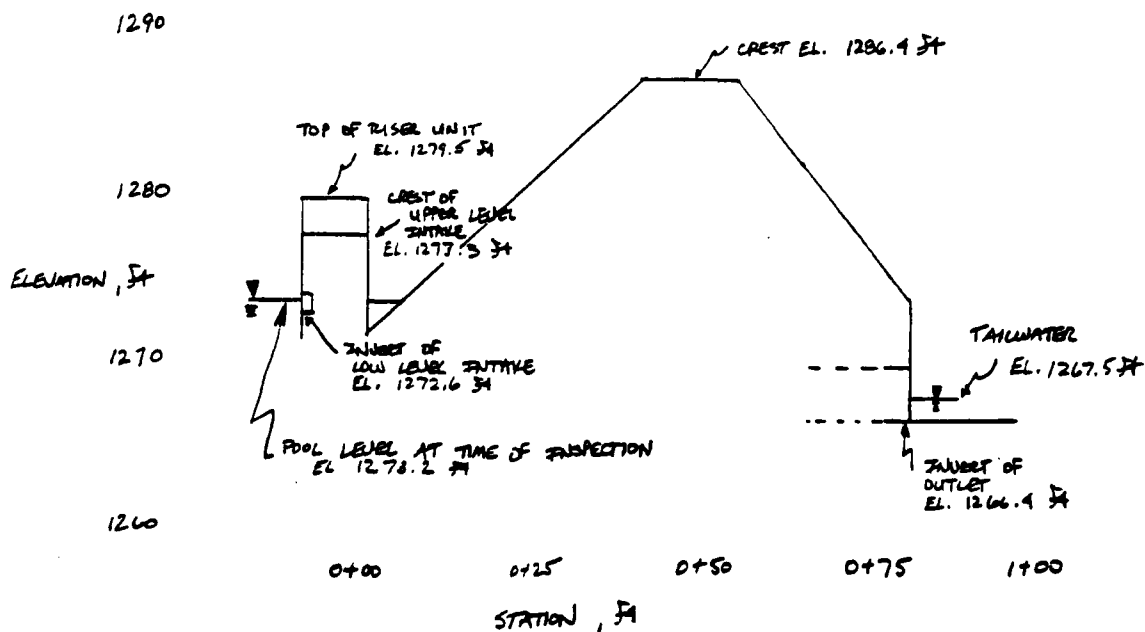
TOP OF DAM PROFILE
TYPICAL CROSS-SECTION

DATES OF INSPECTION: 8 and 10 December 1979

TOP OF DAM PROFILE



CROSS-SECTION AT STATION 12+30



APPENDIX B

ENGINEERING DATA CHECK LIST

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION

Name of Dam: PINE RUN DAM
NDI # PA 00737

ITEM	REMARKS
PLAN OF DAM	See Plate 3
REGIONAL VICINITY MAP	The USGS 7.5 minute topographic quadrangles, Jackson Center and Hadley, Pennsylvania were used to prepare the regional vicinity map included as Plate 1 in this report.
CONSTRUCTION HISTORY	The dam was built in 1970 by Kirila Contractors of Brookfield, Ohio.
TYPICAL SECTIONS OF DAM	See Plates 5 and Appendix D
HYDROLOGIC/HYDRAULIC DATA	Design computations from the SCS design report for Pine Run Dam were reviewed for this report. These computations are summarized in Section 5 and Appendix D.
OUTLETS - PLAN	See Plate 7
- DETAILS and CONSTRAINTS	See Plates 7 and 10
- DISCHARGE RATINGS	Discharge ratings were included in the SCS design report for this dam and are summarized in Appendix D.
RAINFALL/RESERVOIR RECORDS	None available

Name of Dam: PINE RUN DAM
NDI # PA 00737

B-2

ITEM	REMARKS
DESIGN REPORTS	The SCS design report for Pine Run Dam is available from the Harrisburg, Pennsylvania SCS office.
GEOLOGY REPORTS	See Appendix F; this information is also available in the SCS design report for Pine Run Dam.
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	These analyses are all contained in the SCS design report for Pine Run Dam.
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	The results of foundation and borrow excavation tests are contained in the SCS design report for Pine Run Dam.
POST-CONSTRUCTION SURVEYS OF DAM	None
BORROW SOURCES	The majority of the borrow material used for construction of the embankment was taken from near the right abutment of the dam. Further specifications of the material are contained in the SCS design report.

Name of Dam: PINE RUN DAM

NDI # PA 00737

ITEM	REMARKS
MONITORING SYSTEMS	None
MODIFICATIONS	None
HIGH POOL RECORDS	The reservoir level has never reached the elevation of the emergency spillway crest.
POST-CONSTRUCTION ENGINEERING STUDIES AND REPORTS	None
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	None
MAINTENANCE OPERATION RECORDS	No extensive records are kept. Routine maintenance is performed by Mercer County personnel. The dam is visited 4 to 5 times during the summer months. It is annually inspected by Mercer County and SCS personnel. The dam is also checked after heavy rainfalls.

B-4

Name of Dam: PINE RUN DAM

NDI # PA 00737

ITEM	REMARKS
------	---------

SPILLWAY PLAN,

SECTIONS,
and
DETAILS

See Plates 6, 7, and 10

OPERATING EQUIPMENT
PLANS & DETAILS

There is no operating equipment.

CHECK LIST
HYDROLOGIC AND HYDRAULIC DATA
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: 1.64 sq.mi. (Primarily farmland and forests)

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 1272.6 ft. M.S.L.
(17.7 ac.-ft.; sediment storage capacity)

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): 1279.7 ft. M.S.L.
(225 ac.-ft.)

ELEVATION MAXIMUM DESIGN POOL: 1283.9 ft. M.S.L. (483 ac.-ft.)

ELEVATION TOP DAM: 1286.1 ft. M.S.L.

SPILLWAY: Emergency Spillway

- a. Crest Elevation 1279.7 ft. M.S.L.
- b. Type Trapezoidal vegetated earth channel
- c. Width of Crest Parallel to Flow 125 ft.
- d. Length of Crest Perpendicular to Flow 1260 ft.
- e. Location Spillover Left abutment
- f. Number and Type of Gates None

OUTLET WORKS: Principal Spillway

- a. Type Two stage drop-inlet riser connected to a 36 in.
- b. Location Center of embankment concrete outlet pipe
- c. Entrance Inverts Low level intake El. 1272.6 ft. M.S.L.;
- d. Exit Inverts 1266.4 ft. M.S.L. upper level intake El. 1277.3 ft. M.S.L.
- e. Emergency Drawdown Facilities 21 in. dia. drawdown pipe extending into reservoir from riser structure

HYDROMETEOROLOGICAL GAGES: None

- a. Type _____
- b. Location _____
- c. Records _____

MAXIMUM NON-DAMAGING DISCHARGE None of record

APPENDIX C

PHOTOGRAPH LOCATION PLAN AND PHOTOGRAPHS

DETAILED PHOTOGRAPH DESCRIPTION

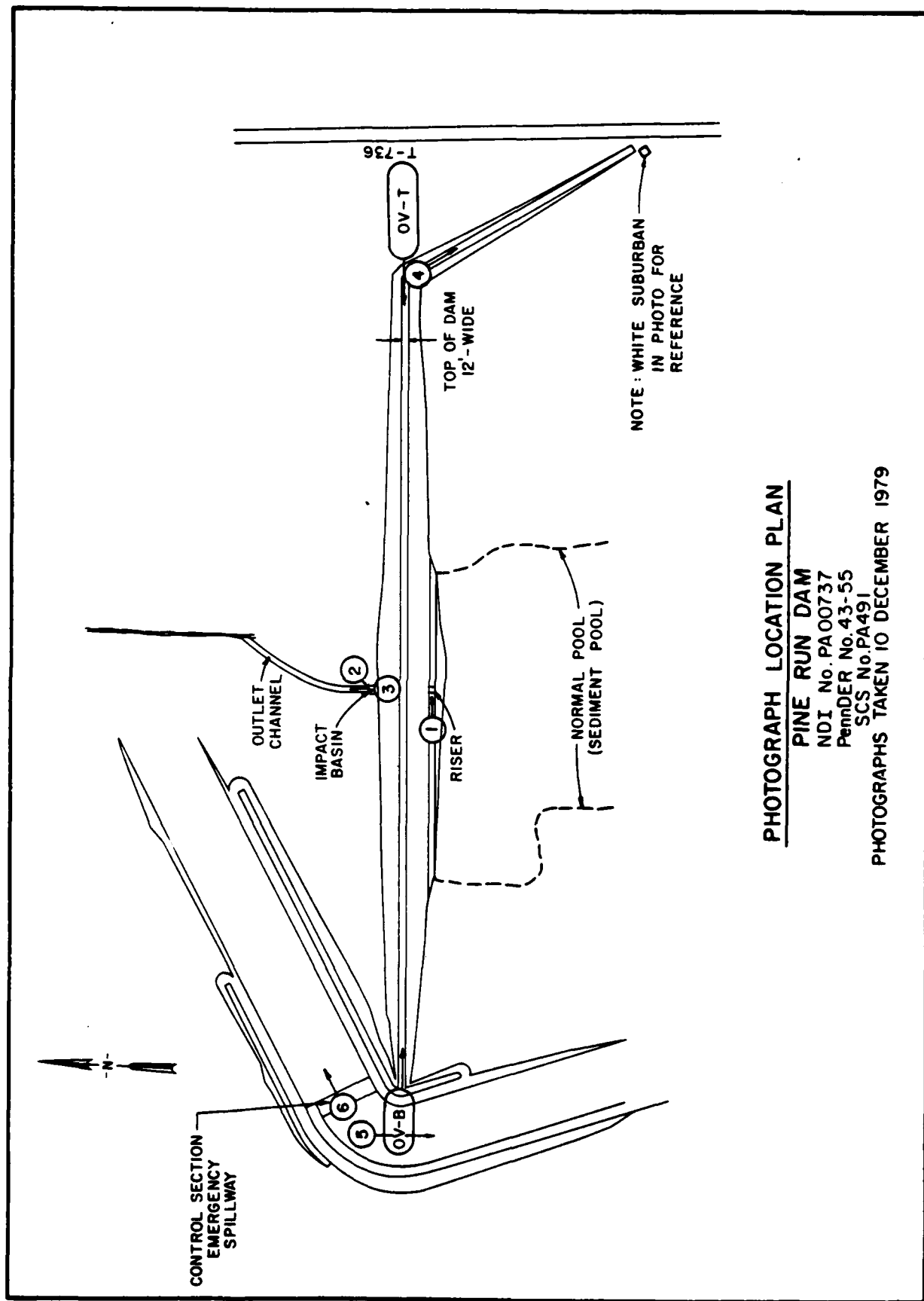
Overall View of Dam

- Top Photo - Overall View of Dam from Right End (Junction
(OV-T) with right wing) of the Main Embankment
- Bottom Photo - Overall View of Dam from Left End (Junction
(OV-B) with emergency spillway) of the Main Embankment

Photograph Location Plan

- Photo 1 - View of the Principal Spillway Intake Structure
- Photo 2 - View of the Principal Spillway Outlet Structure
- Photo 3 - View of the Outlet Channel of the Principal Spillway
- Photo 4 - View of the Right Wing of the Embankment from the
Junction with the Main Embankment
- Photo 5 - View from the Control Section of the Emergency Spillway Looking Upstream
- Photo 6 - View from the Control Section of the Emergency Spillway Looking Downstream

Note: Photographs were taken on 10 December 1979.



PHOTOGRAPH LOCATION PLAN

PINE RUN DAM

NDI No. PA00737

PennDER No. 43-55

SCS No. PA491

PHOTOGRAPHS TAKEN 10 DECEMBER 1979

PINE RUN DAM

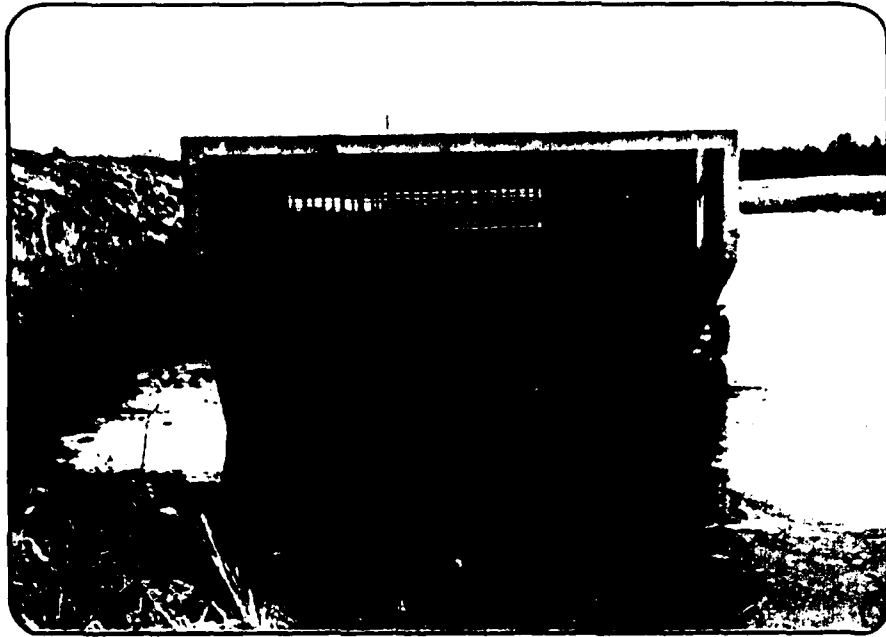


PHOTO 1. View of the Principal Spillway Intake Structure

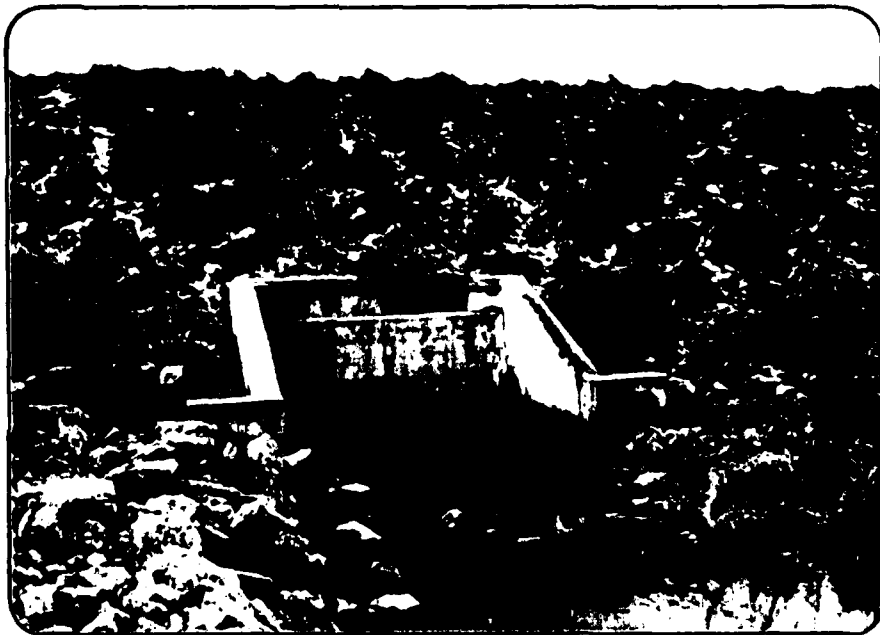


PHOTO 2. View of the Principal Spillway Outlet Structure

PINE RUN DAM

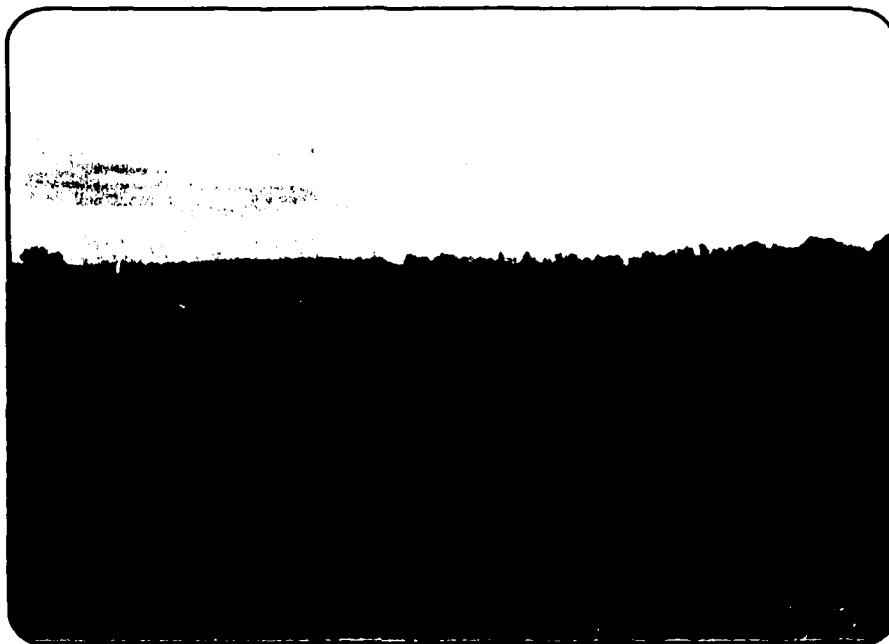


PHOTO 3. View of the Outlet Channel of the Principal Spillway

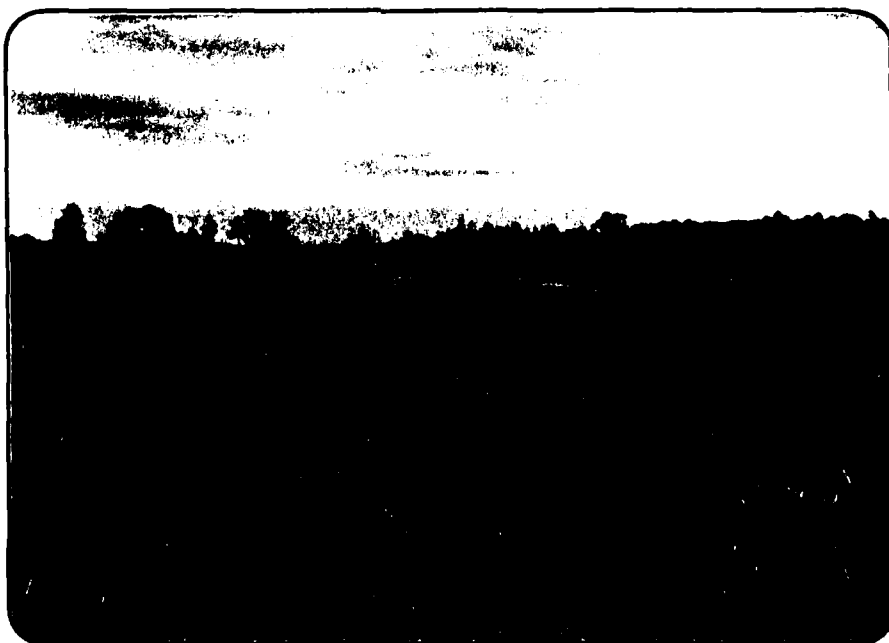


PHOTO 4. View of the Right Wing of the Embankment from the Junction with the Main Embankment

PINE RUN DAM



**PHOTO 5. View from the Central Section of the Emergency Spillway
Looking Upstream**



**PHOTO 6. View from the Control Section of the Emergency Spillway
Looking Downstream**

APPENDIX D

HYDROLOGIC AND HYDRAULIC COMPUTATIONS

MICHAEL BAKER, JR., INC.

THE BAKER ENGINEERS

Box 280
Beaver, Pa. 15009

Subject PINE RUN DAM S.O. No. _____
APPENDIX D - HYDROLOGIC AND Sheet No. _____ of _____
HYDRAULIC DATA Drawing No. _____
Computed by _____ Checked by _____ Date _____

<u>SUBJECT</u>	<u>PAGE</u>
HYDROLOGY AND HYDRAULIC DATA BASE	1
REMARKS	2
HYDROLOGIC DATA	3
STAGE VS. STORAGE, AREA DATA	4
STAGE VS. DISCHARGE DATA	4
TOP OF DAM PROFILE AND TYPICAL CROSS-SECTION	5
DRAINAGE BASIN MAP	6

HYDROLOGY AND HYDRAULIC ANALYSIS
DATA BASE

NAME OF DAM: PINE RUN DAM

PROBABLE MAXIMUM PRECIPITATION (PMP) = 23.4 INCHES/24 HOURS⁽¹⁾

STATION	1	2	3	4	5
Station Description	PINE RUN DAM				
Drainage Area (square miles)	1.64				
Cumulative Drainage Area (square miles)	1.64				
Adjustment of PMF for Drainage Area (%) ⁽²⁾	Zone 2				
6 Hours	117				
12 Hours	127				
24 Hours	141				
48 Hours	151				
72 Hours	--				
Snyder Hydrograph Parameters					
Zone (3)	27	(SCS parameters shown on sheet 3)			
C _p /C _t (4)	0.40/2.7				
L (miles) (5)	1.98				
L _{ca} (miles) (5)	0.59				
t _r = C _t (L·L _{ca}) ^{0.3} (hours)	2.83				
Spillway Data					
Crest Length (ft)					
Freeboard (ft)					
Discharge Coefficient	(Spillway rating curve shown on sheet 4)				
Exponent					

(1) Hydrometeorological Report 33 (Figure 1), U.S. Army, Corps of Engineers, 1956.

(2) Hydrometeorological Report 33 (Figure 2), U.S. Army, Corps of Engineers, 1956.

(3) Hydrological zone defined by Corps of Engineers, Baltimore District, for determining Snyder's Coefficients (C_p and C_t).

(4) Snyder's Coefficients.

(5) L = Length of longest water course from outlet to basin divide.

L_{ca} = Length of water course from outlet to point opposite the centroid of drainage area.

MICHAEL BAKER, JR., INC.
THE BAKER ENGINEERS

Box 280
Beaver, Pa. 15009

Subject PINE RUN DAM S.O. No. _____
Sheet No. 2 of 6
Drawing No. _____
Computed by WDL Checked by _____ Date 3-10-80

PINE RUN DAM WAS DESIGNED BY THE SCS IN ACCORDANCE WITH STANDARD CRITERIA (CIRCA 1966). THE DESIGN FLOOD WAS BASED ON RAINFALL ESSENTIALLY EQUAL TO THE PROBABLE MAXIMUM PRECIPITATION. THEREFORE, THE DAM SHOULD BE CAPABLE OF PASSING THE PROBABLE MAXIMUM FLOOD (PMF) WITHOUT OVERTOPPING. IN VIEW OF THE ABOVE, NO ADDITIONAL HYDROLOGIC OR HYDRAULIC CALCULATIONS WERE PERFORMED FOR THIS REPORT. THE SCS CALCULATIONS WERE REVIEWED AND ARE SUMMARIZED IN THIS APPENDIX.

IT SHOULD BE NOTED THAT THE SCS CALCULATIONS ARE BASED UPON A DRAINAGE AREA OF 2.24 SQUARE MILES. IT APPEARS THAT A SWAMPY AREA TO THE EAST OF THE DAM, HALFMOON SWAMP, WAS INCLUDED IN THE WATERSHED BEHIND THE DAM. THIS AREA DOES NOT DIRECTLY DRAIN INTO THE PINE RUN WATERSHED, MAKING THE ACTUAL DRAINAGE AREA ONLY 1.64 SQUARE MILES. HOWEVER, THIS PROBLEM DOES NOT ADVERSELY AFFECT HYDROLOGIC AND HYDRAULIC CALCULATIONS PREPARED BY THE SCS. RATHER, IT MAKES THESE CALCULATIONS EVEN MORE CONSERVATIVE.

PINE RUN DAM SHOULD THEREFORE PASS THE SDF SELECTED FOR THIS REPORT WITHOUT OVERTOPPING THE DAM.

MICHAEL BAKER, JR., INC.
THE BAKER ENGINEERS

Box 280
Beaver, Pa. 15009

Subject PINE RUN DAM S.O. No. _____
HYDROLOGIC DATA Sheet No. 3 of 6
Drawing No. _____
Computed by WDL Checked by _____ Date _____

DRAINAGE AREA = 2.24 SQ. MI.

TIME OF CONCENTRATION = 2.57 HOURS

STORM DURATION = 6.0 HOURS

RUNOFF CURVE NUMBERS :

DESIGN HYDROGRAPH (AMC II) CN = 92

FREESBOARD HYDROGRAPH (AMC II) CN = 77

HYDROGRAPH	RAINFALL (IN)		RUNOFF (IN)	PEAK FLOW (CFS)
	POINT	AREAL		
EMERGENCY SPILLWAY	10.25	9.53	8.56	4810
FREESBOARD	20.50	19.07	15.90	9315

THE ABOVE INFORMATION IS FROM THE SCS DESIGN
REPORT FOR PINE RUN DAM (PA 491)

100-YEAR RAINFALL VALUES: (FROM TP-40) (FOR COMPARISON WITH
VALUES USED IN SCS DESIGN)

30 MIN. RAINFALL : 1.9 IN.
1 HOUR RAINFALL : 2.4 IN.
2 HOUR RAINFALL : 2.9 IN.
3 HOUR RAINFALL : 3.3 IN.
6 HOUR RAINFALL : 3.7 IN.
12 HOUR RAINFALL : 4.6 IN.
24 HOUR RAINFALL : 4.9 IN.

PMF 6 HOUR RAINFALL = 27.4 INCHES (FROM HMR-33)

MICHAEL BAKER, JR., INC.
THE BAKER ENGINEERS

Box 280
Beaver, Pa. 15009

Subject PINE RUN DAM S.O. No. _____
STAGE VS STORAGE, AREA DATA Sheet No. 4 of 6
STAGE VS DISCHARGE DATA Drawing No. _____
Computed by UJDL Checked by _____ Date 3-10-80

THE FOLLOWING DATA IS FROM THE SCS "DESIGN REPORT" FOR
PINE RUN DAM:

STAGE (ft)	STORAGE (Ac-ft)	AREA (Ac)
1269.0	0	0
1270.0	0.8	1.5
1275.0	57.8	21.3
1280.0	224.6	45.4
1285.0	513.4	70.1
1290.0	918.6	92.0

STAGE (ft)	DISCHARGE		TOTAL * (cfs)	REMARKS
	OUTLET WORKS (cfs)	SPILLWAY (cfs)		
1273.1	-	-	0	
1274.1	11.2	-	11.2	INVERT OF LOW LEVEL TAILLET AT EL. 1272.6 ft
1275.1	15.8	-	15.8	
1276.1	19.4	-	19.4	
1277.3	23.0	-	23.0	
1278.3	81.4	-	81.4	UPPER LEVEL TAILLET CREST AT EL. 1277.3 ft
1279.7	112	-	112	
1282.1	124	634	758	EMERGENCY SPILLWAY CREST AT EL. 1279.3 ft
1283.1	129	1279	1408	
1283.8	132	1932	2064	
1284.4	135	2593	2728	
1285.5	139	3533	4072	
1286.4	143	5295	5438	TOP OF DAM AT 1286.1 ft
1287.2	146	6180	6826	
1287.9	149	8082	8231	

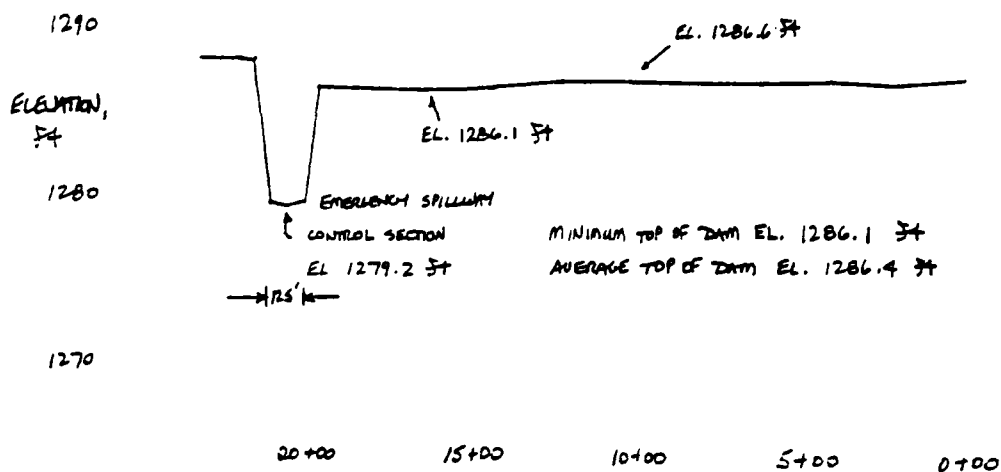
* INCLUDES A SUBTRACTION FOR BASE FLOW

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THE BAKER ENGINEERS

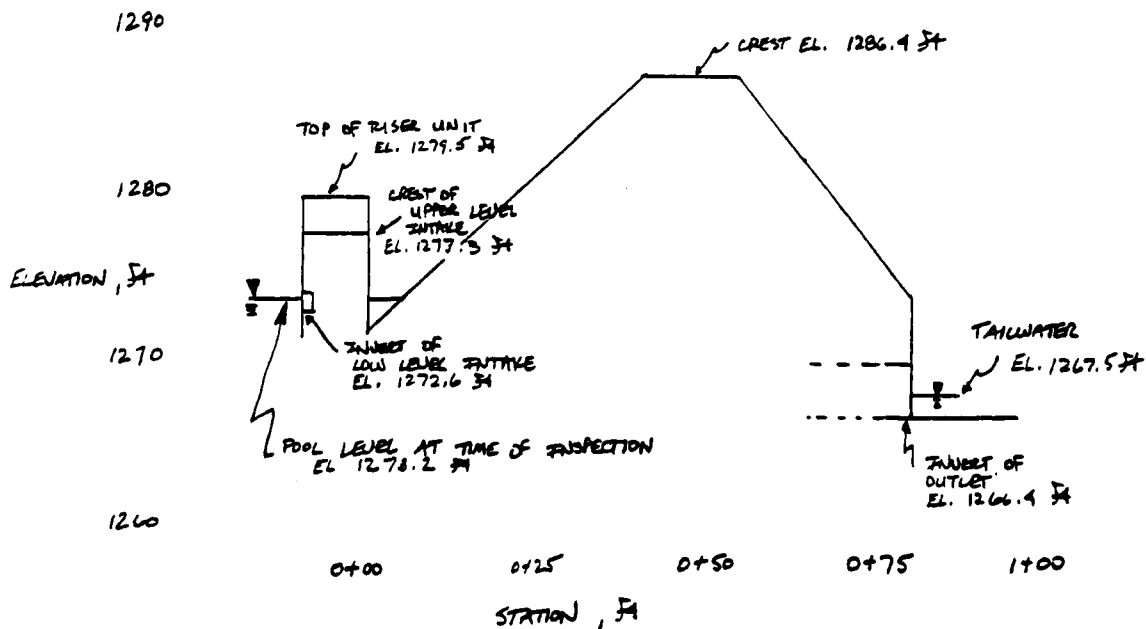
Box 280
Beaver, Pa. 15009

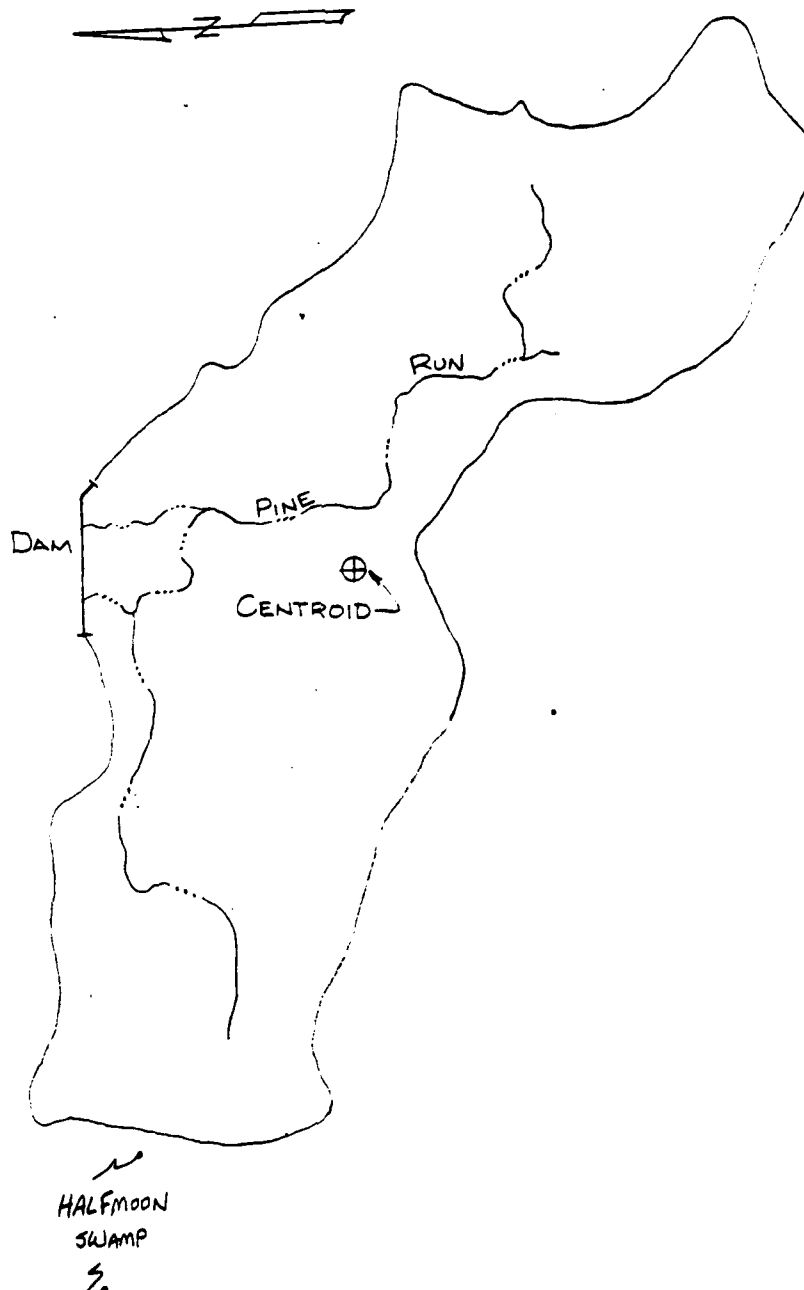
Subject PINE RUN DAM S.O. No. _____
TOP OF DAM PROFILE AND Sheet No. 5 of 6
TYPICAL CROSS-SECTION Drawing No. _____
Computed by WDL Checked by WLS Date 12-8-79

TOP OF DAM PROFILE



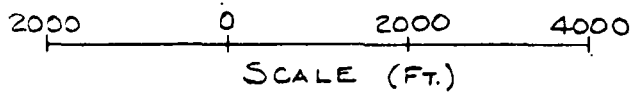
CROSS-SECTION AT STATION 12+30





QUAD:
JACKSON CENTER

PINE RUN DAM

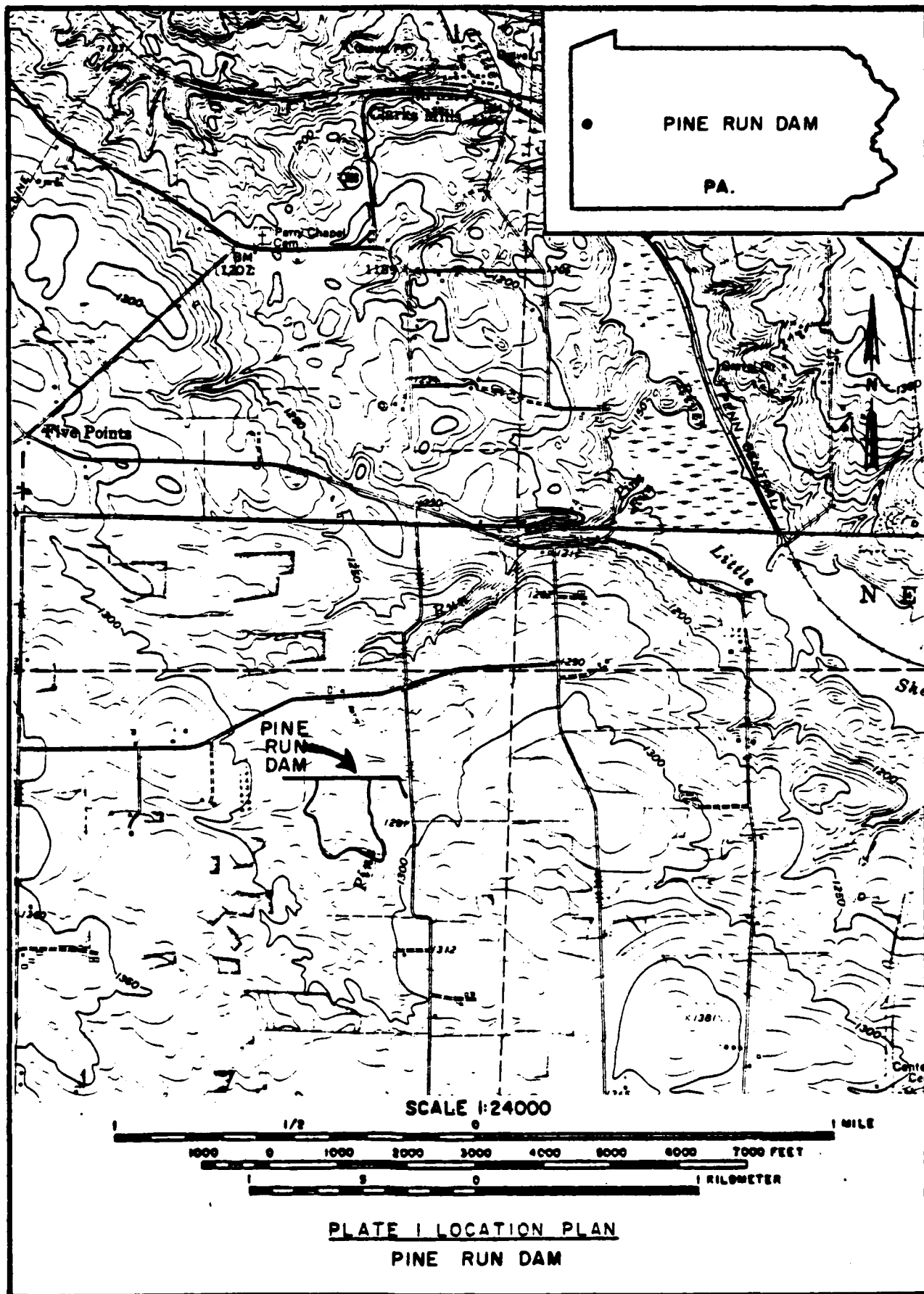


APPENDIX E

PLATES

CONTENTS

- Plate 1 - Location Plan
- Plate 2 - Watershed Map
- Plate 3 - Plan of Structural Works
- Plate 4 - Plan of Structural Works
- Plate 5 - Fill Placement
- Plate 6 - Spillway Excavation
- Plate 7 - Principal Spillway
- Plate 8 - Off Trench Details
- Plate 9 - Drainage Details
- Plate 10 - Impact Basin Details



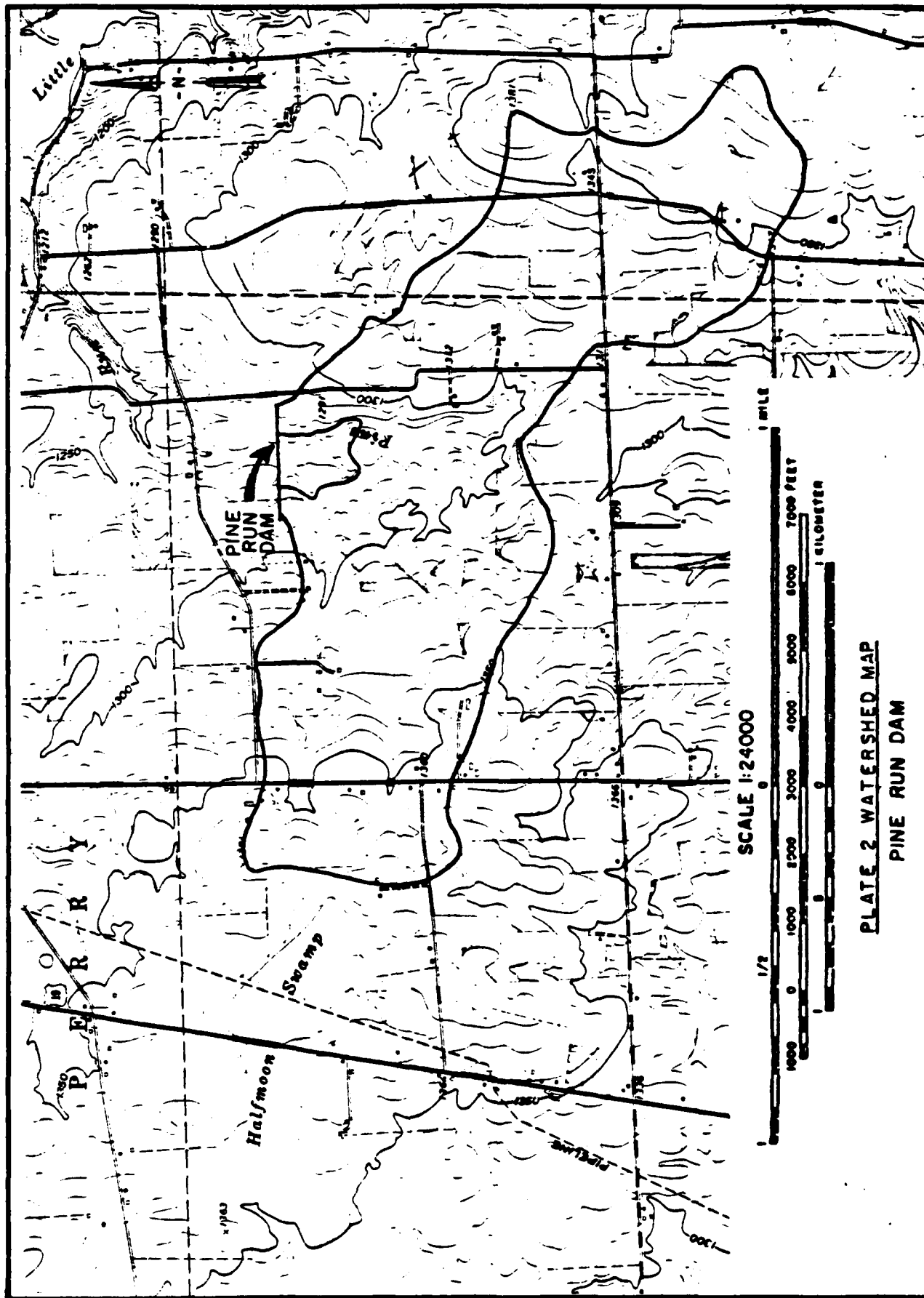
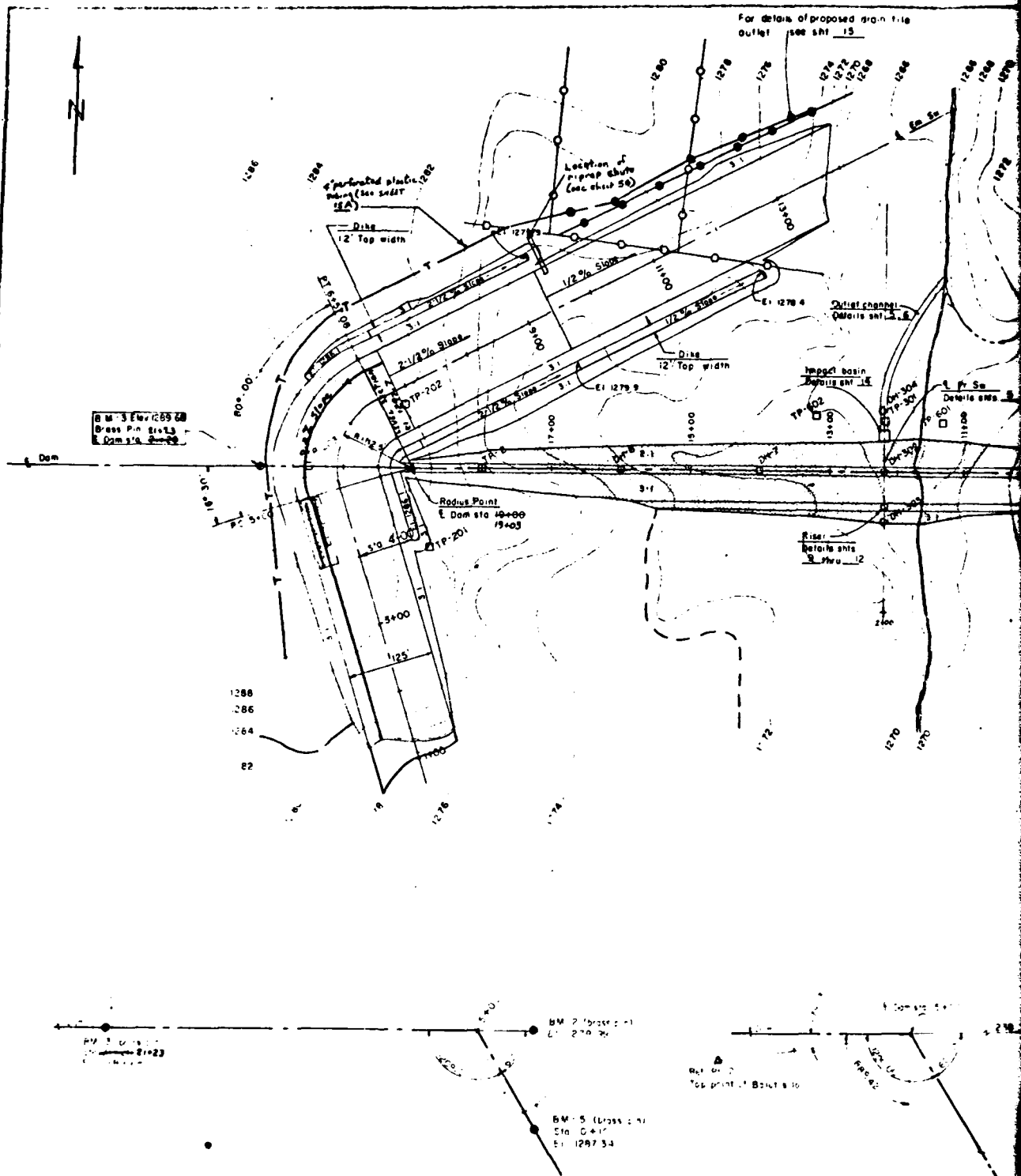


PLATE 2 WATERSHED MAP

PINE RUN DAM



E Dam Layout

- LEGEND**
- Design high water El. 1283.9
 - Normal pool El. 1272.6
 - ~~~~~ Stream
 - - - - - Stream (intermittent)
 - _{OK} □_{VP} Test holes
 - Existing drain tile (approx.)
 - Drain tile outlet (proposed)
 - ▭ Foundation excavation (approx.)

CONSTRUCTION NOTES

- 1 For logs of test holes see sheets 16, 17
- 2 $\frac{1}{2}$ Dam = $\frac{1}{2}$ Cut-off trench.
- 3 Contour interval = 2'
- 4 Drain line outlet to be installed, actual depth, connections to existing drain tile lines & extent to be determined in the field
- 5 All existing drain tile within the limits of the emergency spillway excavation shall be removed

EMERGENCY SPILLWAY CURVE DATA

	STATION	REFLECTION	CHORD
I = 80°	PC 5+00	0° 00'	
R = 112.5'	5+19.63	5° 00'	19.61
E = 34.36'	5+39.27	10° 00'	
M = 26.32'	5+58.90	15° 00'	
C = 144.63'	5+78.54	20° 00'	
LC = 157.08'	5+98.17	25° 00'	
T = 94.40'	6+17.81	30° 00'	
PC = 5+00	6+37.44	35° 00'	
PT = 6+57.08	PT 6+57.08	40° 00'	

$$43.55 = 3$$

FILE NUMBER

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THE DEPARTMENT OF ENVIRON-
MENTAL RESOURCES.

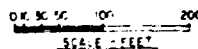
6. 2-14-12

Robert W. Smith

FILE CLERK

PLATE 3

AS BUILT PLANS



LITTLE SHENANGO RIVER WATERSHED

FLOODWATER WE'ARONG 2 AM PA-43

CRAWFORD AND MERCER COUNTIES, PENNSYLVANIA

PLAN OF STRUCTURAL WORKS

U. S. DEPARTMENT OF AGRICULTURE

2. *old & broken 1/60*

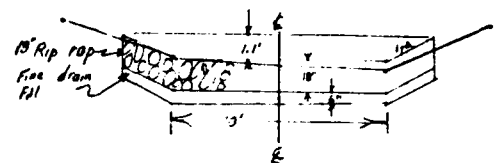
2 CRICK 2-68

PA-491-P

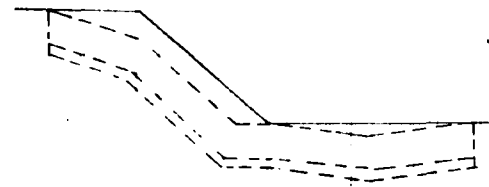
BM-2 REFERENCE

Rip-Rap Chute

Section A-A



Section E Rip-Rap Chute



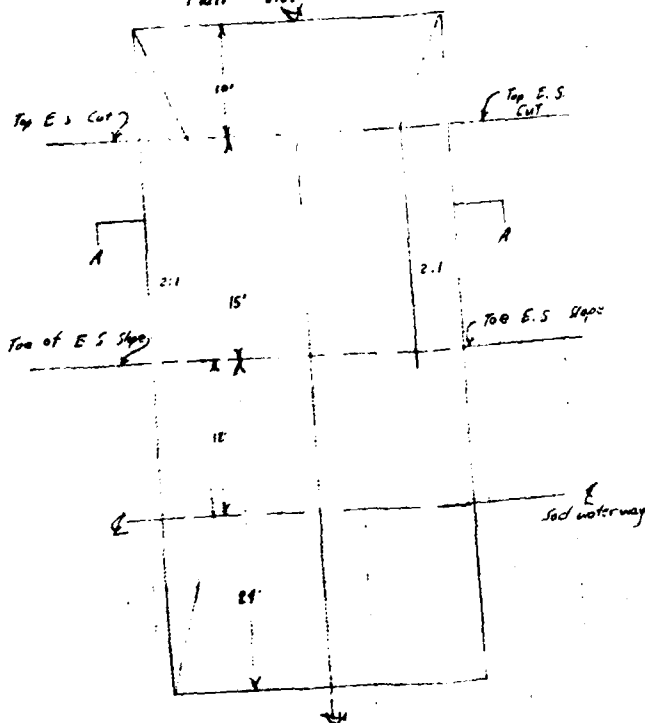
Quantities R
F
E

FILE NO. 352

ON 2-14-72

FILE CLERK

Photo View



Riprap - 40 c.y. } 53 c.y. to be paid
Fine Filter - 13 c.y. } 03 riprap?
Excavation - 168 c.y.

PLATE 4

AS BUILT PLANS

Little Snemanga
Road Retard 19 1/2 mi Ph 40
Merced Canal 19 mi 40
Plan of street 12 1/2 mi
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

1000000 S. E. Y. C. R. G.

9-14-70

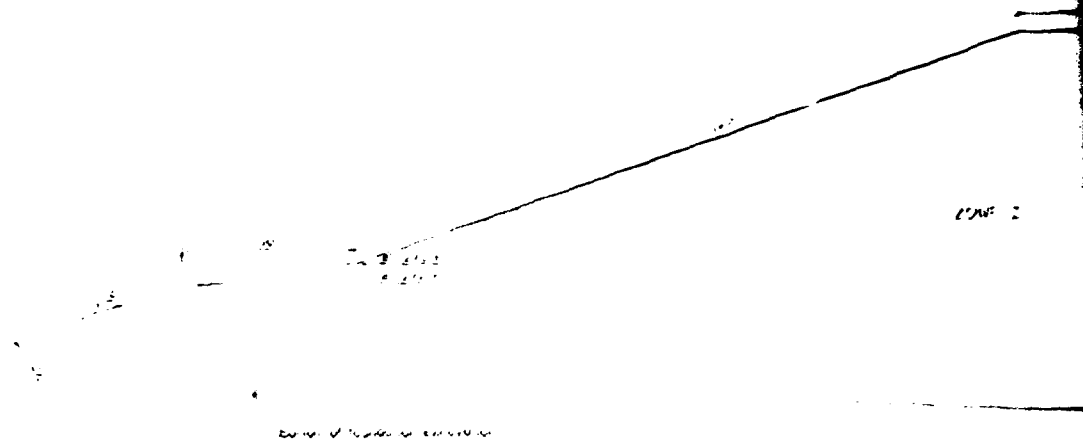
AG-708 B.

Drawn

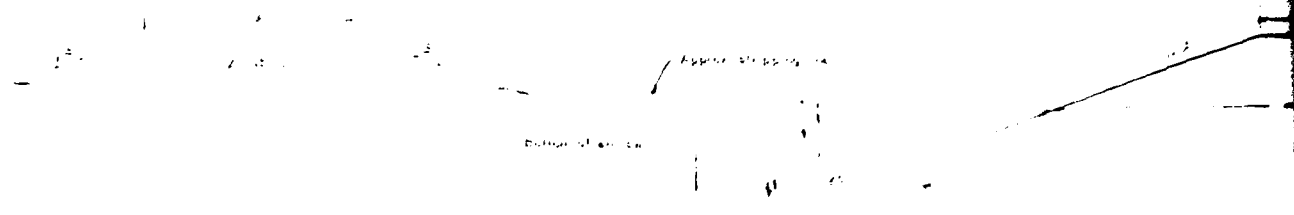
True

44-38861-2

3A, 7A-77



TYPICAL SECTION C



TYPICAL SECTION OF EMERGENCY ROAD WAY WITH DITCHES

43-55-4

FILE NUMBER

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THE DEPARTMENT OF ENVIRONMENTAL
RESOURCES.

ON 2-14-72

FILE CLERK

Settled fill at 1286.1

Original ground

Varies

E. Drain Trench
Details sh. 8

CONSTRUCTION NOTES

1. For constructed fill elevations see sh. 7.
2. Constructed slopes are:
 - 2.91:1 Upstream
 - 1.94:1 Downstream
3. Selectively place the coarser grained material on the outside shell.

EARTH FILL REQUIREMENTS

ZONE	MATERIAL	1 MAX ROCK SIZE	2 MAX LIFT	3 REQ'D WATER CONTENT	COMPACTION	
					CLASS	DEFINITION
I	Material as represented by TP 202 1, Depth 1'-4' classified as ML, by TP 202 2, Depth 4'-0.5', classified as ML, or by TP 112 1, Depth 1'-7', classified as SC-SM.	6"	9"	Optimum Moisture or Higher	A	95% Max density by ASTM D-698 Method A

1. For fill adjacent to structures, max rock size = 3"
2. Maximum permissible lift thickness before compaction
3. Water content of fill matrix at time of compaction
4. For typical compaction curves see sh. 18

PLATE 5

AS BUILT PLANS

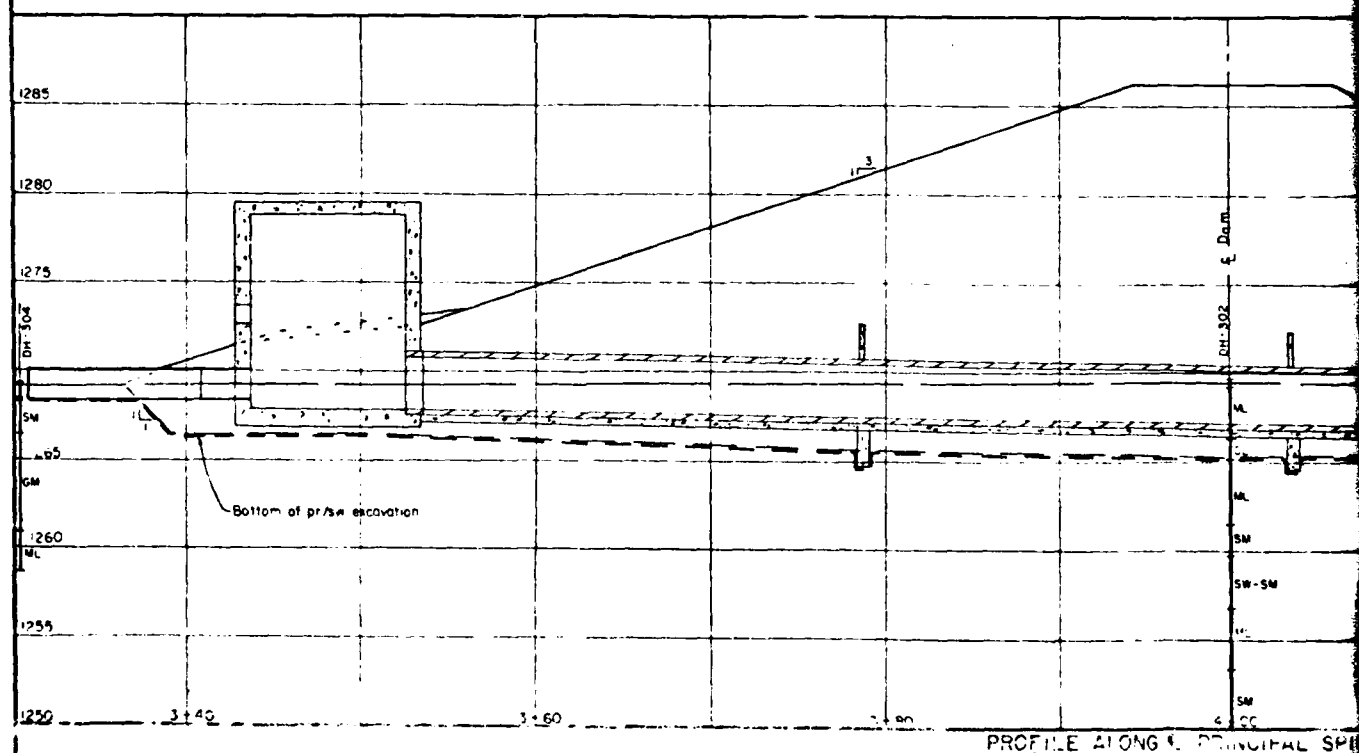
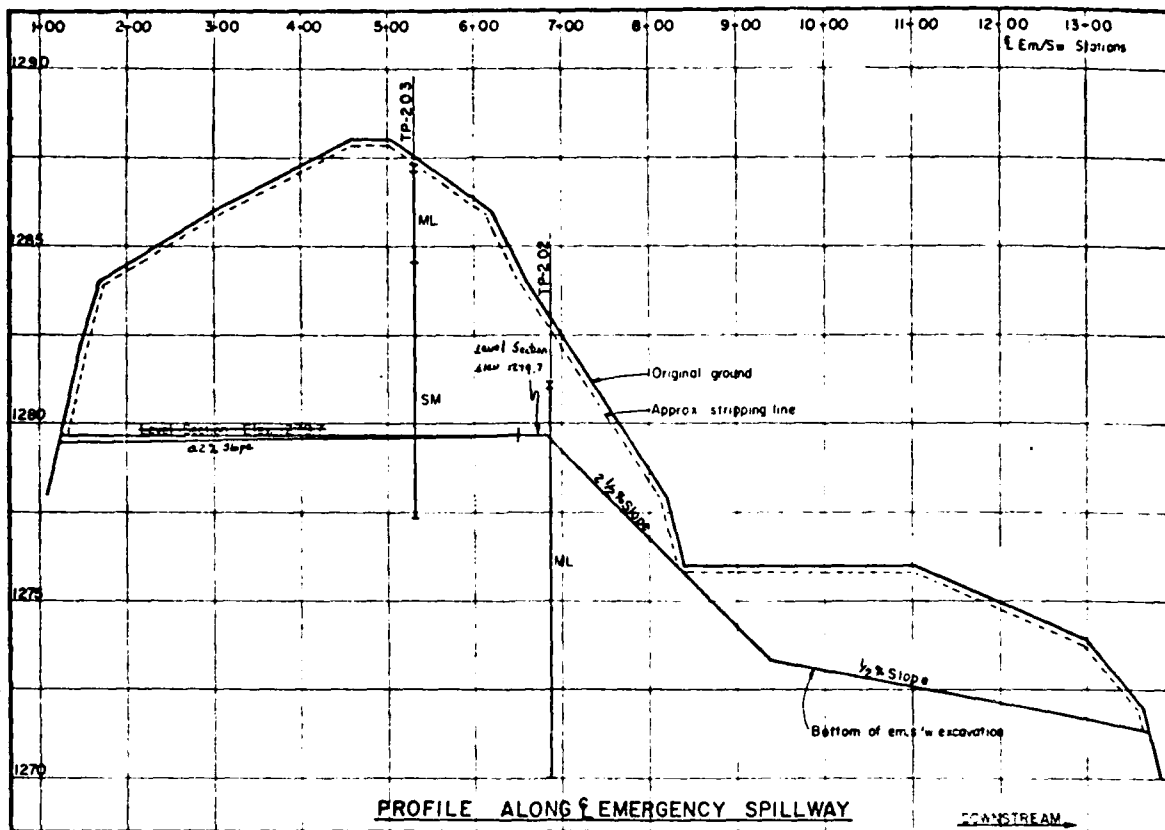
0 1 2 5 10
SCALE IN FEETLITTLE SHENANGO RIVER WATERSHED
FLOODWATER RETARDING DAM PA-491
CRAWFORD AND MERCER COUNTIES, PENNSYLVANIA
FILL PLACEMENT

U.S. DEPARTMENT OF AGRICULTURE

Donald C. Hickey
C. CHASE

PA-491-P

2



43-55-5

FILE NUMBER

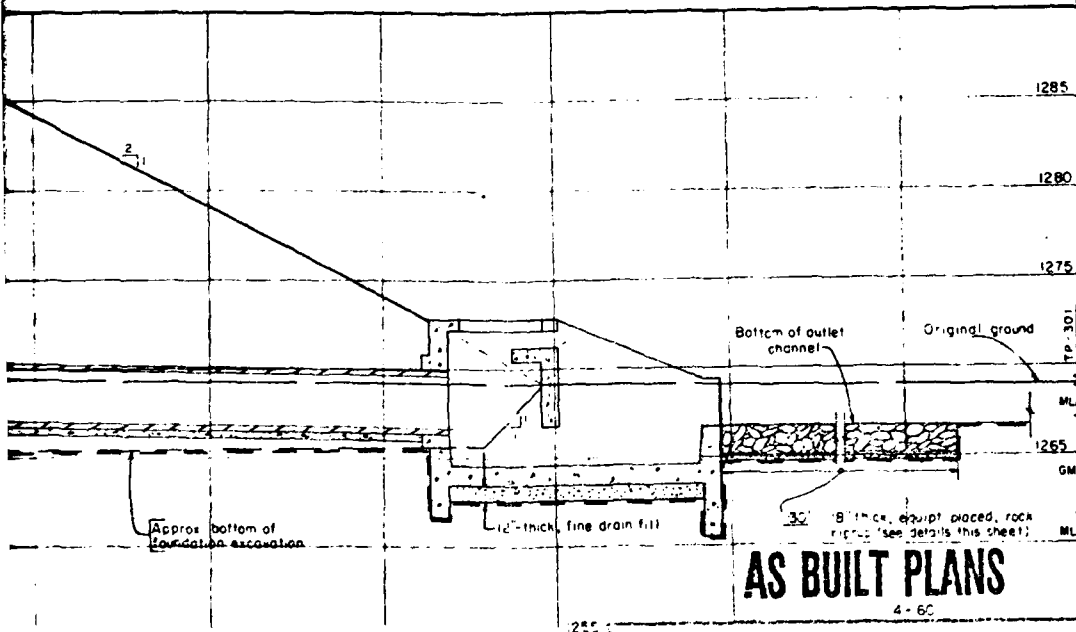
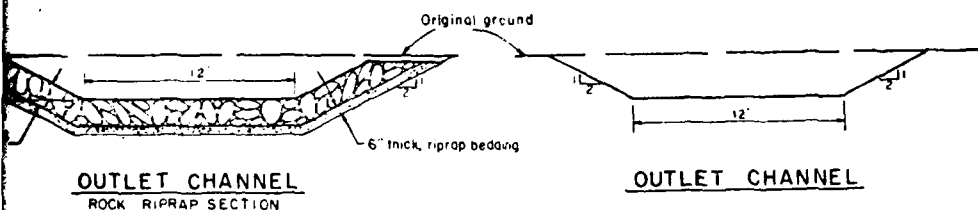
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ON 2-14-74

Robert [Signature]

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PLATE 6



AS BUILT PLANS

4-60

LITTLE SHENANGO RIVER WATERSHED
FLOODWATER RETARDING DAM PA-491
GRAYFORD AND MERCER COUNTIES, PENNSYLVANIA
SPILLWAY EXCAVATION

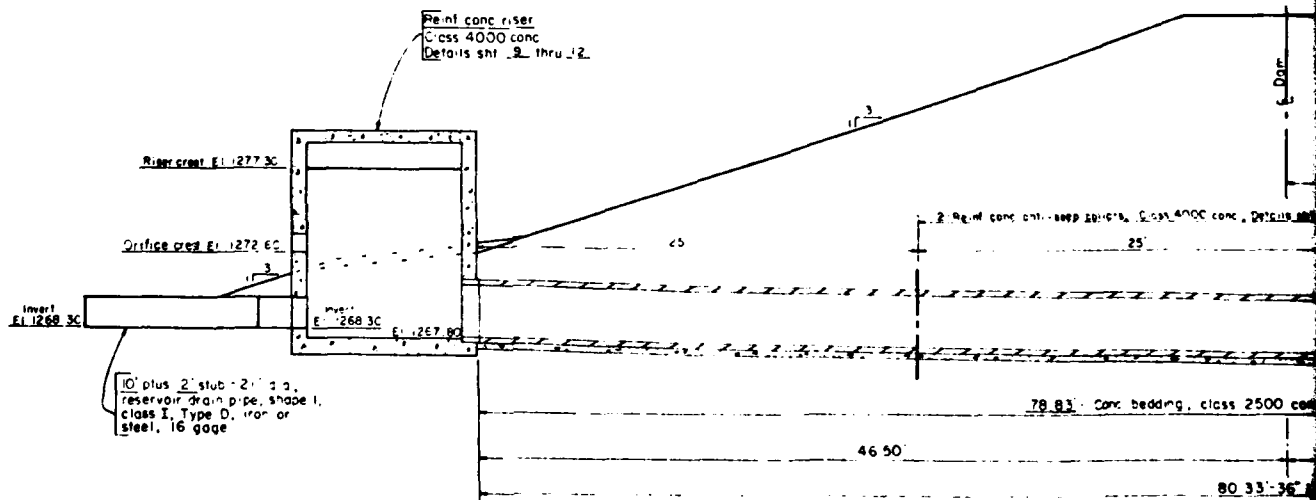
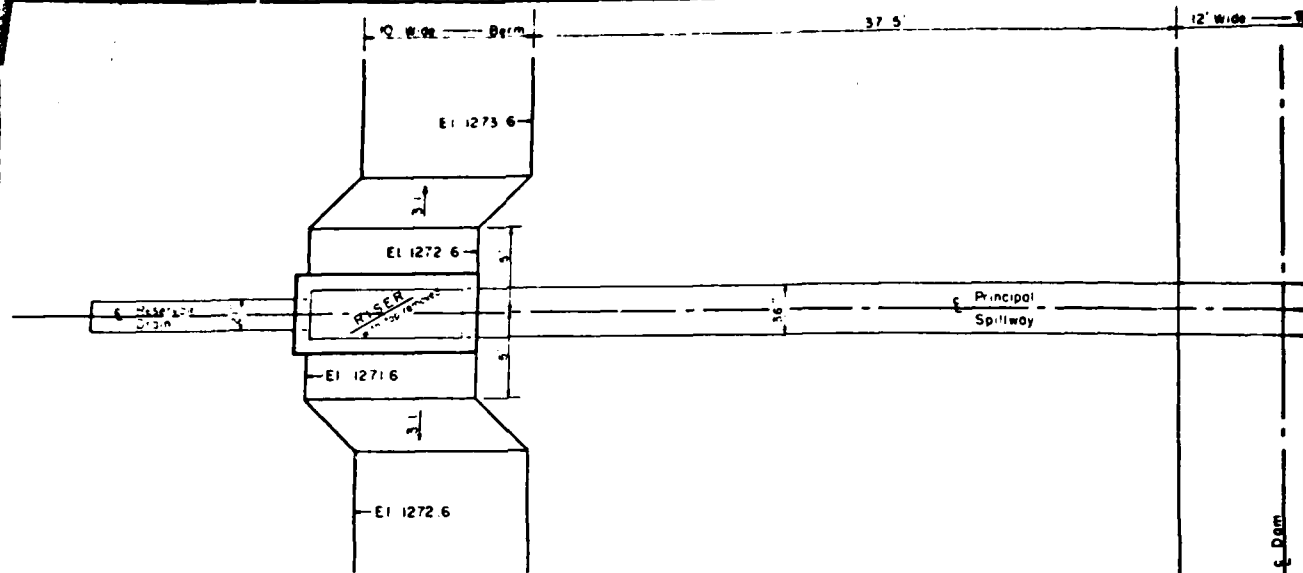
U.S. DEPARTMENT OF AGRICULTURE

C. ORISKANY

PA-491-P

CONSTRUCTION NOTES

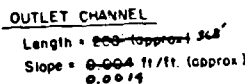
- For drain fill gradation limits see sheet 2
- Riprap bedding shall meet fine drain fill gradation limits



JOINT DIFF. JOINT DATA		
JOINT	DISTANCE FROM RISER WALL	INVERT ELEV.
J-6	29.33	1267.40
J-3	30.33	1267.53
J-9	60.33	1267.10
J-5	80.33	1266.59

COLLAR DATA FOR 36" PIPE (AS BUILT)		
COLLAR	DISTANCE FROM RISER WALL	INVERT ELEV.
1	10.00	100.00
2	10.00	100.00
3	10.00	100.00
4	10.00	100.00
5	10.00	100.00
6	10.00	100.00
7	10.00	100.00
8	10.00	100.00
9	10.00	100.00
10	10.00	100.00
11	10.00	100.00
12	10.00	100.00
13	10.00	100.00
14	10.00	100.00
15	10.00	100.00
16	10.00	100.00
17	10.00	100.00
18	10.00	100.00
19	10.00	100.00
20	10.00	100.00
21	10.00	100.00
22	10.00	100.00
23	10.00	100.00
24	10.00	100.00
25	10.00	100.00
26	10.00	100.00
27	10.00	100.00
28	10.00	100.00
29	10.00	100.00
30	10.00	100.00
31	10.00	100.00
32	10.00	100.00
33	10.00	100.00
34	10.00	100.00
35	10.00	100.00
36	10.00	100.00
37	10.00	100.00
38	10.00	100.00
39	10.00	100.00
40	10.00	100.00
41	10.00	100.00
42	10.00	100.00
43	10.00	100.00
44	10.00	100.00
45	10.00	100.00
46	10.00	100.00
47	10.00	100.00
48	10.00	100.00
49	10.00	100.00
50	10.00	100.00
51	10.00	100.00
52	10.00	100.00
53	10.00	100.00
54	10.00	100.00
55	10.00	100.00
56	10.00	100.00
57	10.00	100.00
58	10.00	100.00
59	10.00	100.00
60	10.00	100.00
61	10.00	100.00
62	10.00	100.00
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67	10.00	100.00
68	10.00	100.00
69	10.00	100.00
70	10.00	100.00
71	10.00	100.00
72	10.00	100.00
73	10.00	100.00
74	10.00	100.00
75	10.00	100.00
76	10.00	100.00
77	10.00	100.00
78	10.00	100.00
79	10.00	100.00
80	10.00	100.00
81	10.00	100.00
82	10.00	100.00
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85	10.00	100.00
86	10.00	100.00
87	10.00	100.00
88	10.00	100.00
89	10.00	100.00
90	10.00	100.00
91	10.00	100.00
92	10.00	100.00
93	10.00	100.00
94	10.00	100.00
95	10.00	100.00
96	10.00	100.00
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99	10.00	100.00
100	10.00	100.00

- ### CONSTRUCTION NOTES

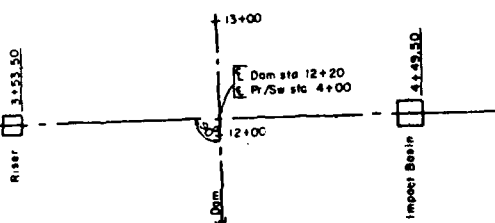


FILE NUMBERS

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CR 2-14-77

FILE NO. 100-442887-100



LAYOUT OF PRINCIPAL SPILLWAY
NOT TO SCALE



AS BUILT PLANS

LITTLE SHENANGO RIVER WATERSHED
FLOODWATER RETARDING DAM PA-491
CRANFORD AND MERCER COUNTIES, PENNSYLVANIA
PRINCIPAL SPECIALTY

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Donald R. Shalun 12/67

2 31434

1-50

signed: Snyder : 08

PA-491-F

35' = Reinforced concrete pressure pipe sanitary conduit

Fig. 3. 100% sections

3 = 30° x 30° (not fitting for 2" wall)

Progress being made in the work of the Commission.

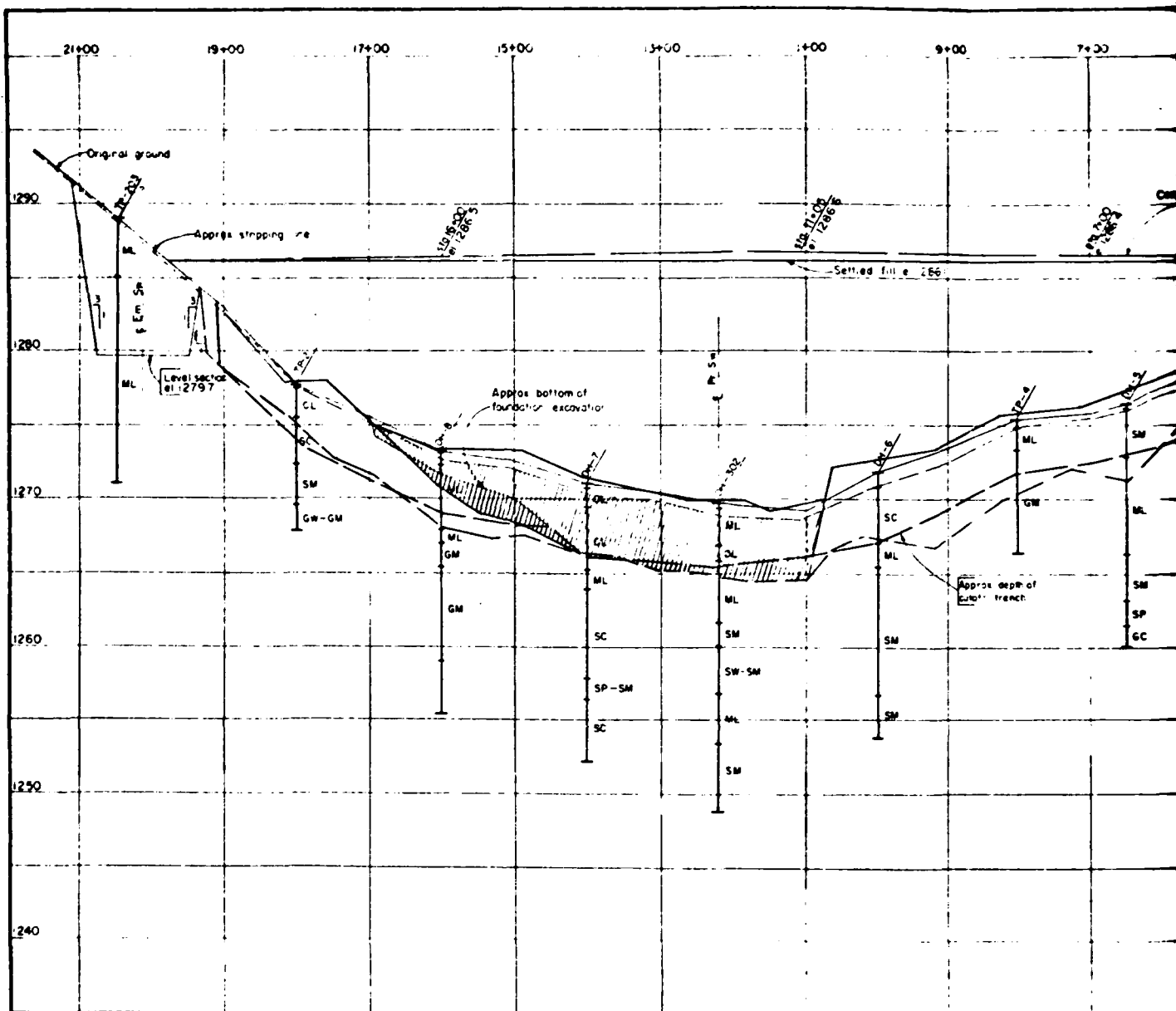
0-444,70 HENRI - 10-10-50

M. A. A. eggs bearing a strength '32'

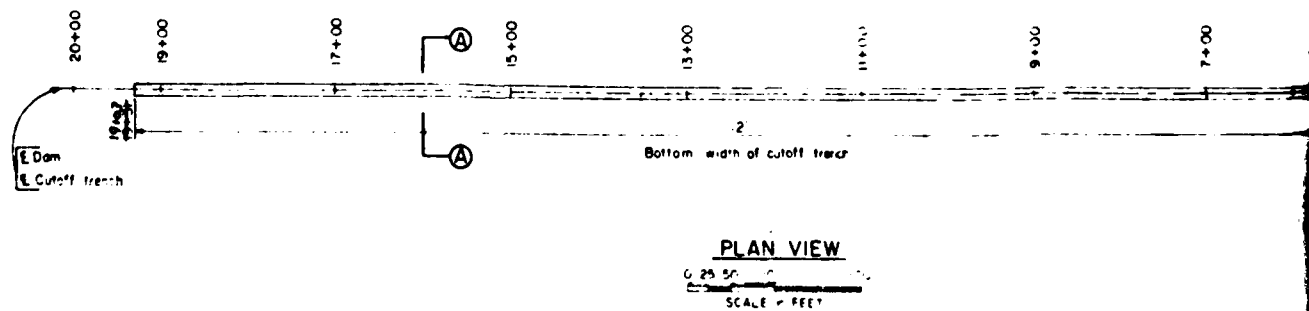
2. 21" Girder non-compressed : 22 x 8 220 lbs per lin ft

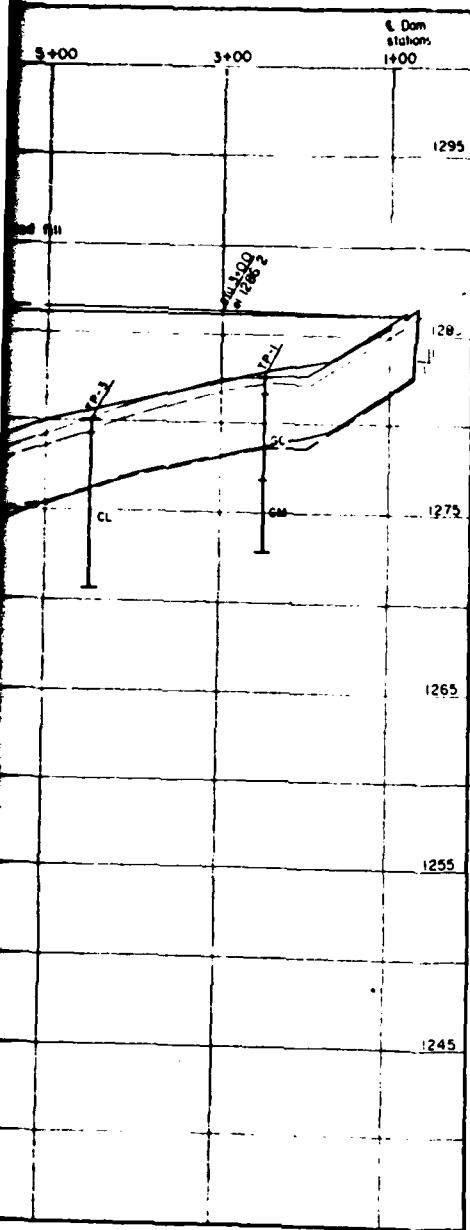
2. 20" Grade prestressed pipe = \$680 lbs per lin ft

02 13 Təqdimat



PROFILE ALONG CUTOFF TRENCH & DAM





43-55-7

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ON 2-14-72

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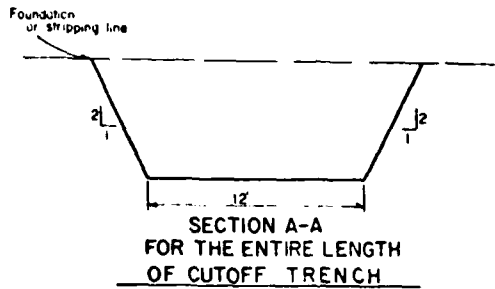
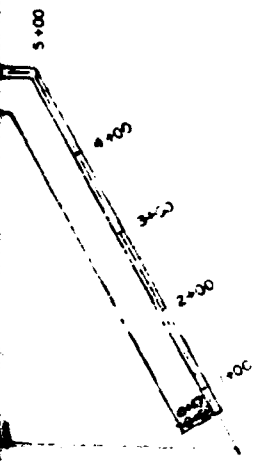


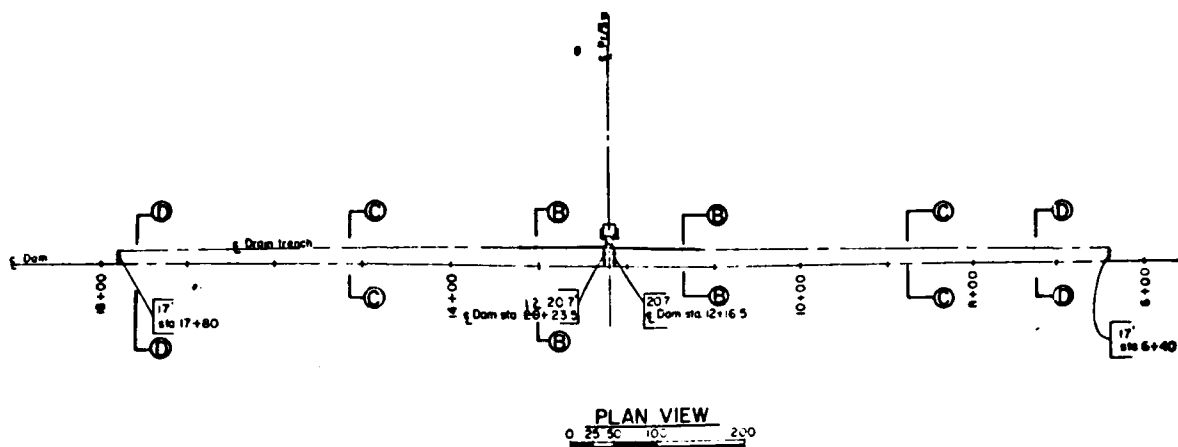
PLATE 8

NOTE
For logs of test holes see sheets 16 & 17

AS BUILT PLANS

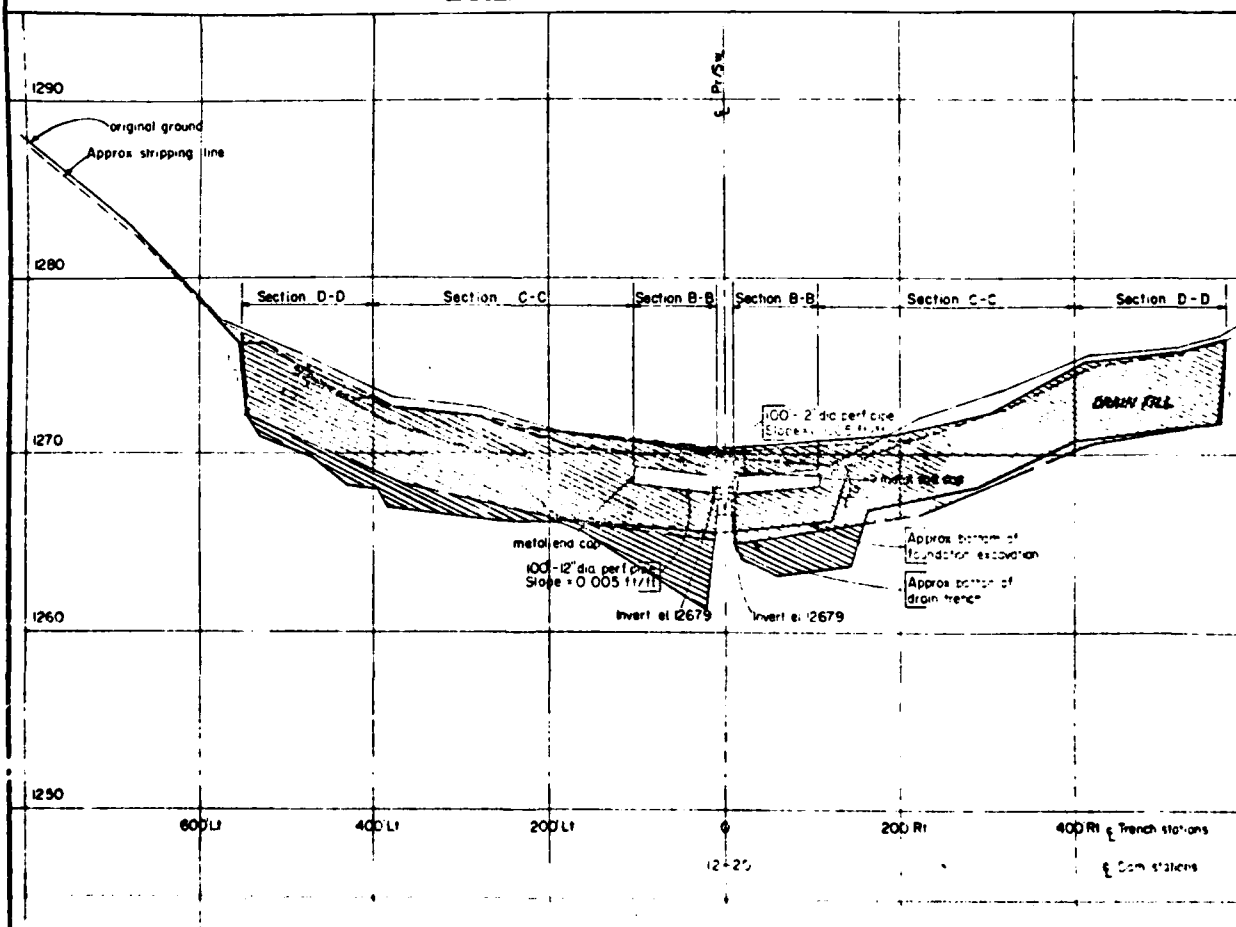


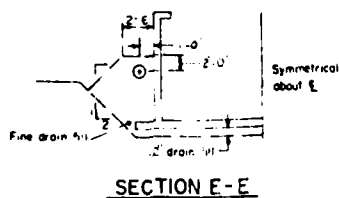
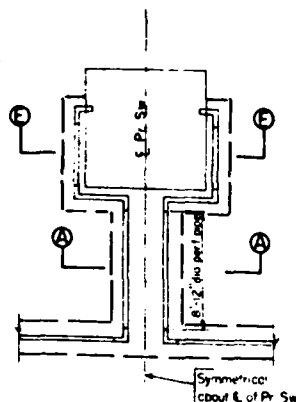
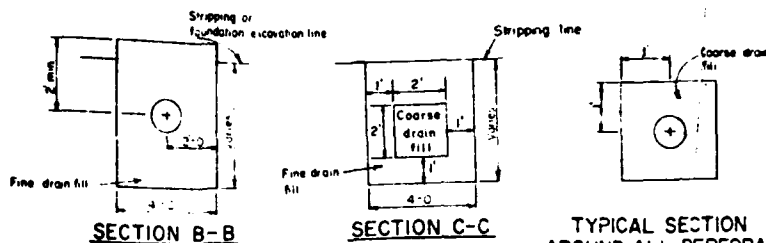
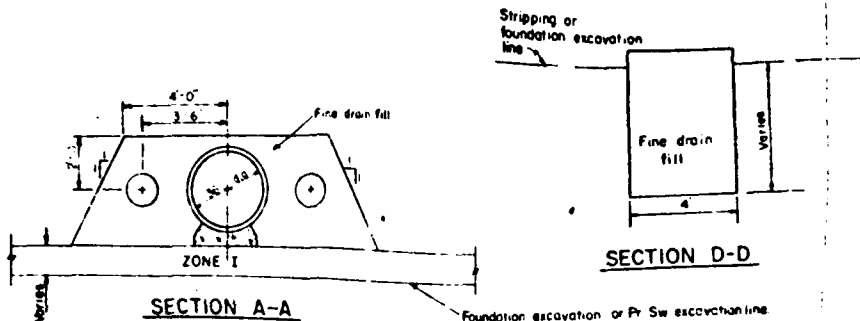
LITTLE SHENANGO RIVER WATERSHED
FLOODWATER RETARDING DAM PA-491
CRAWFORD AND MERCER COUNTIES, PENNSYLVANIA
OFF TRENCH DETAILS
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
Donald R. Wibley 1/68
D.L. FLEIG 1-68
Richard J. Snyder 2-68 PA-491-P



For drain pipe around
Basin see sheet

PROFILE ALONG E DRAIN TRENCH





BILL OF MATERIALS

- 10 - 20' Sections
- 2 - 8' Sections
- 2 - 6' Sections
- 4 - 2" x 2" 90° elbows
- 2 - 1" x 2" 90° elbows
- 2 - 1" x 1" 90° elbows
- 2 - Metal end caps
- 2 - Small animal guards - see shd 15
- 256'-0" TOTAL

PLAN OF OUTLET DRAIN

43-55-8

IN THE OFFICE OF
THE DEPARTMENT OF ENVIRONMENTAL RESOURCES.

OR 2-14-72

Robert M. Huth

FILE CLERK

Construction notes

All drain pipe shall conform to material specification 110, and shall be 12" dia., 16 gauge, shape 1, class I, Type D perforated pipe.

AS BUILT PLANS
PLATE 9

GRADATION LIMITS FOR DRAIN FILL

Sieve No.	% Passing (based on dry weight)
no. 20	100
no. 40	100
no. 60	100
no. 80	100
no. 100	100
no. 120	100
no. 150	100
no. 200	100

Sieve No.	% Passing (based on dry weight)
no. 10	100
no. 20	100
no. 40	100
no. 60	100
no. 80	100
no. 100	100
no. 120	100
no. 150	100
no. 200	100

LITTLE SHENANGO RIVER WATERSHED

FLOODWATER RETARDING DAM PA-491

GRAFFORD AND MERCER COUNTIES PENNSYLVANIA

DRAINAGE DETAILS

U.S. DEPARTMENT OF AGRICULTURE

WATER RESOURCES DIVISION

WATER RESOURCES DIVISION

WATER RESOURCES DIVISION

WATER RESOURCES DIVISION

WATER RESOURCES DIVISION

WATER RESOURCES DIVISION

WATER RESOURCES DIVISION

WATER RESOURCES DIVISION

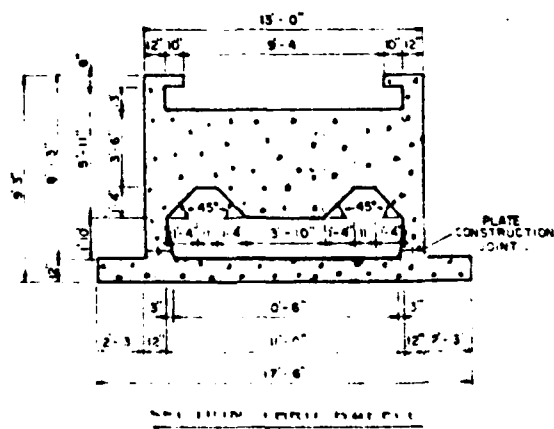
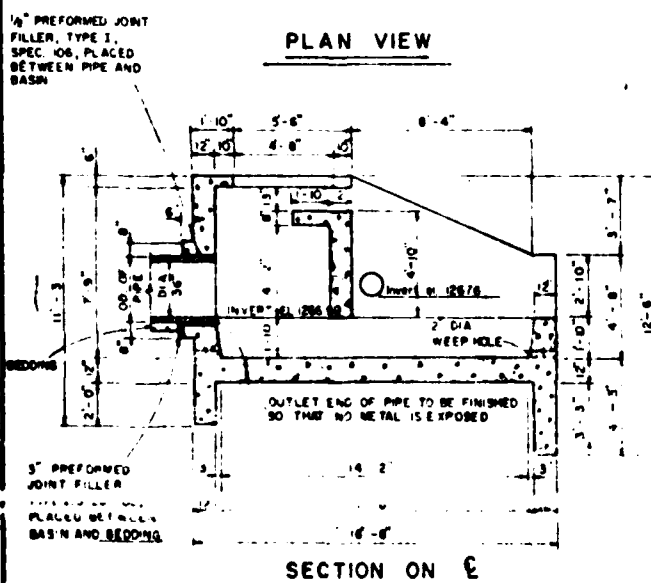
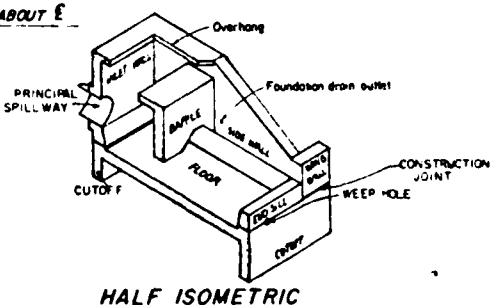
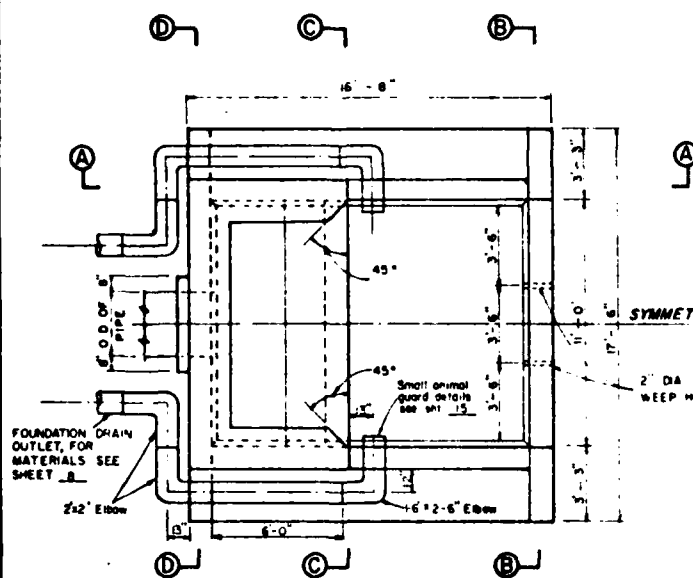
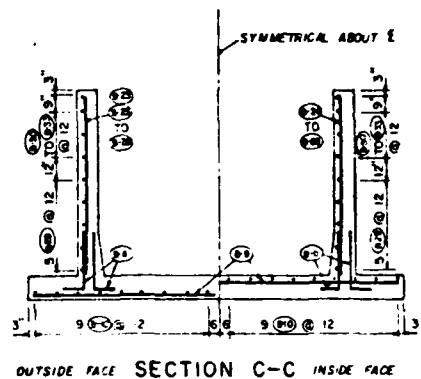
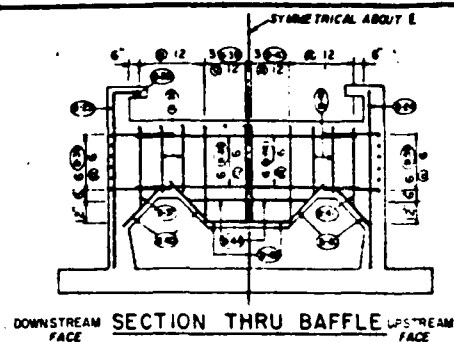
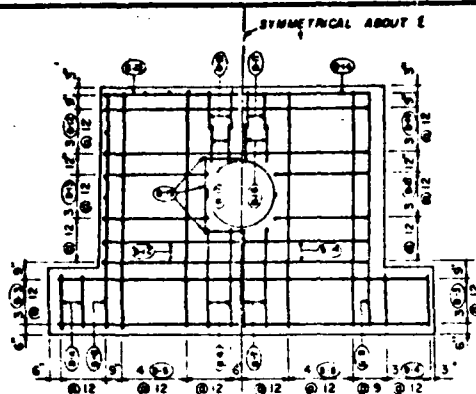
WATER RESOURCES DIVISION

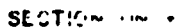
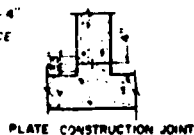
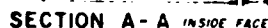
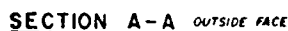
WATER RESOURCES DIVISION

WATER RESOURCES DIVISION

WATER RESOURCES DIVISION

WATER RESOURCES DIVISION





NOTE
For construction details see sheet 11

LENGTH

BAR TYPES

PLATE 10

QUANTITIES (This sheet only)

REINFORCING STEEL

NO 6 BARS 398193 CM FT 4157.3 LBS.

CONCRETE

CLASS 4000 30 00 CU YDS

AS BUILT PLANS

LITTLE SHENANGO RIVER WATERSHED
FLOODWATER RETARDING DAM PA-491
CRAWFORD AND MERCER COUNTIES, PENNSYLVANIA
IMPACT BASIN DETAILS

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

Designed by Fred E. Flemer
in NIKOLICH
Drawn by H. I. Browning Jr.

L. D. HURVEY

Am 1.1.2000

PA-491-P

2

APPENDIX F

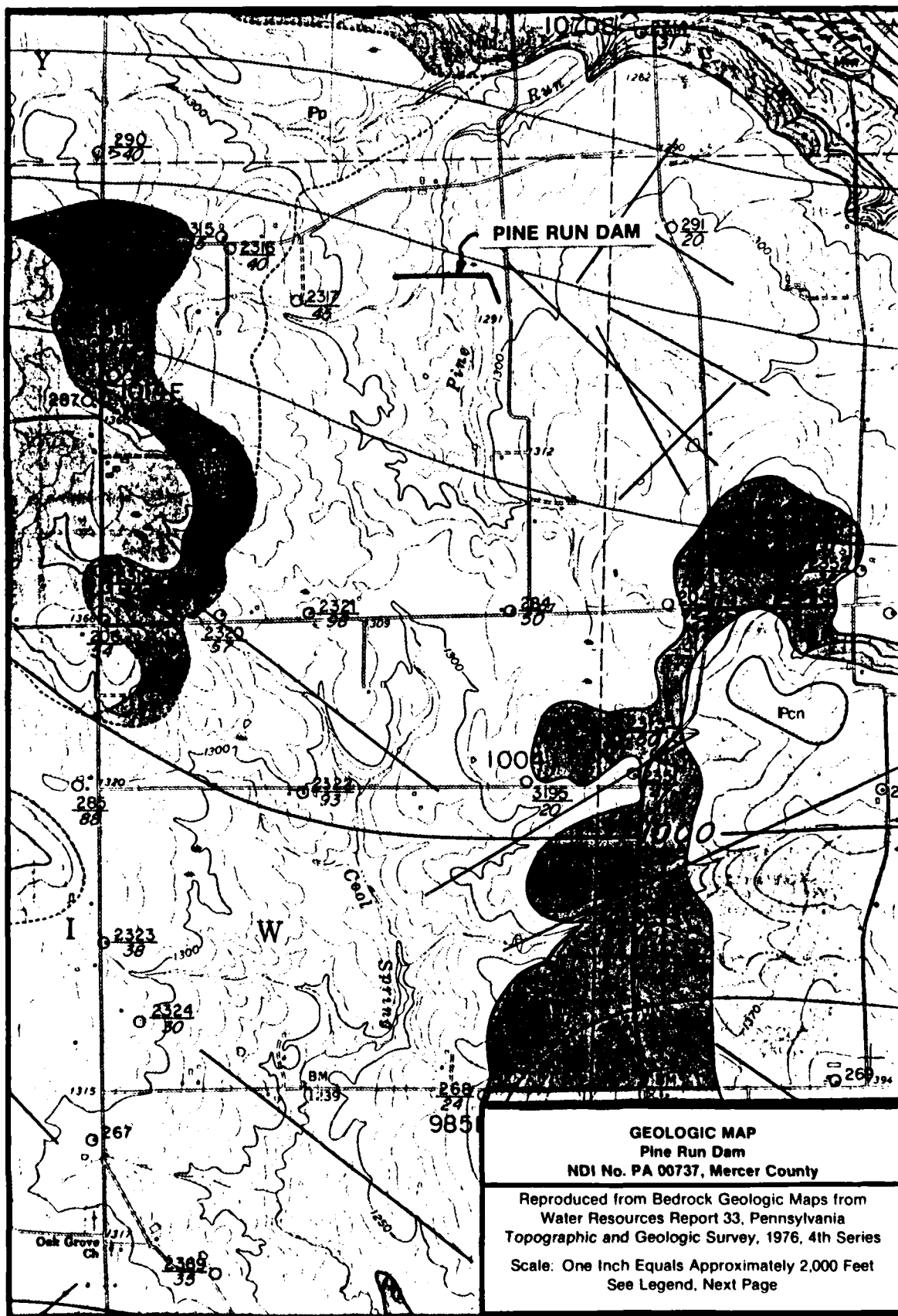
REGIONAL GEOLOGY

PINE RUN DAM
NDI No. PA 00737, PennDER No. 43-55, SCS No. PA 491

REGIONAL GEOLOGY

Bedrock units beneath Pine Run Dam are relatively flat-lying members of the Connoquenessing Formation, Pottsville Group, Pennsylvanian System. This formation consists of medium to fine-grained sandstone with lenses of dark gray shale. Geologic references show numerous fracture traces to the east of the dam and reservoir; however, none are shown at the dam or reservoir. The bedrock is shown to be dipping at approximately 40 feet per mile to the north. No bedrock was encountered in the borings drilled for design of the dam (maximum depth of the borings was 21 feet).

This section of the Appalachian Plateaus Physiographic Province has been glaciated, resulting in deposits of glacial till (Kent Till - ground moraine) of an undetermined thickness at the site. The borings indicated a wide range of classifications of soils and that the groundwater level was near the ground surface (0 to 1.8 feet below the top of the borings). The geologic map and legend on the following pages show the relationship of the dam to the regional geology.



LEGEND

Ph

HOMEWOOD FORMATION

Coarse- to fine-grained sandstone and some shale. Yields small to moderate quantities of water.



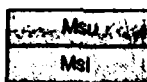
MERCER FORMATION

Mostly dark-gray shale, but contains thin beds of coal and limestone and lenses of sandstone. Generally unimportant as an aquifer, but locally yields may be sufficient for domestic and stock use.

Pco

CONNOQUENESSING FORMATION

Medium- to fine-grained gray sandstone containing lenses of dark-gray shale and discontinuous beds of Quakertown coal. Yields moderate quantities of water that is locally high in iron content.



SHENANGO FORMATION

The upper member (Msu) is composed of soft medium- to dark-gray shale with interbeds of siltstone and lenses of fine-grained sandstone. Unimportant as an aquifer. The lower member (Msl) is composed of medium- to fine-grained light-gray sandstone and medium- to dark-gray shale and siltstone. Yields moderate to large quantities of water that is locally high in iron content at shallow depths.

Pp

POTTSVILLE UNDIFFERENTIATED

Sandstones, possibly containing some relatively thick beds of shale; correlation with Connoquenessing, Mercer, and Homewood Formations uncertain. Unimportant as an aquifer.

Pottsville Group

DATE
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— 8